OFFICE AUTOMATION

GETTING STARTED

OFFICE AUTOMATION

Electronic Mail and Word Processing

You already own the costly hardware you need for electronic mail and word processing. IBM or plug-compatible mainframe. CRT's. 328x printer. TTY dial-ups. TP networks. All you need to get operational is ADR/eMAIL™ and ADR/ETC® software. At a fraction of the cost of expensive processing equipment.

Send Messages Across the Country or Across the Hall

ADR/eMAIL electronic mail can improve communications, increase productivity and slash the cost of paper, telephone calls, postage and equipment. You can use eMAIL to write letters and memos. Read a message and pass it on with comments. Keep copies permanently. Send a message to a person, group or department. eMAIL can be accessed from any location in its terminal network – not just from your regular office. With eMAIL, you can't misplace, forget about, or spill coffee on, your mail. You can actually handle all your mail in only 15 or 20 minutes a day. Best of all, ADR/eMAIL is simple to learn – anyone can use it.

ADR/eMAIL is Integrated With ADR/ETC Word Processing

eMAIL includes an interface to the ADR/ETC word processor for sending and receiving large or highly-formatted documents. Today's most versatile and powerful word processor, ETC lets you generate simple memos, extensive proposals, catalogs, manuals and one or 100,000 personalized letters. It even allows you to link your word processing activities to your data processing systems. ETC also interfaces with typewriter terminals and hardcopy printers for boardroom quality documents.

ADR® is Ready When You Are

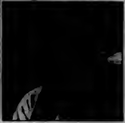
Call or write for more information on how you can increase office productivity, boost employee morale and cut costs substantially. It's as easy as A D R.

APPLIED DATA RESEARCH, Route 206 & Orchard Road, CN-8, Princeton, NJ 08540, (201) 874-9000

APPLIED DATA RESEARCH

The one vendor software solution

CONTENTS



Deciding how to begin in OA can be the hardest step of all. Analyzing, then choosing the approach that's best for you isn't easy, but it's worth it.
(Photo © 1983 Ed Braverman)

COMPUTERWORLD

OA

CW COMMUNICATIONS/INC.
Box 880, 375 Cochituate Road,
Framingham, Mass. 01701

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Computerworld* (ISSN-0010-4841) is published weekly, except: January (6 issues), February (6 issues), March (5 issues), April (7 issues), May (5 issues), June (6 issues), July (6 issues), August (5 issues), September (6 issues), October (6 issues), November (6 issues), and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Computerworld subscription prices: $2.00 a copy; U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). *Computerworld OA* prices: $5.00 a copy, $12.00 a year. Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zebb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

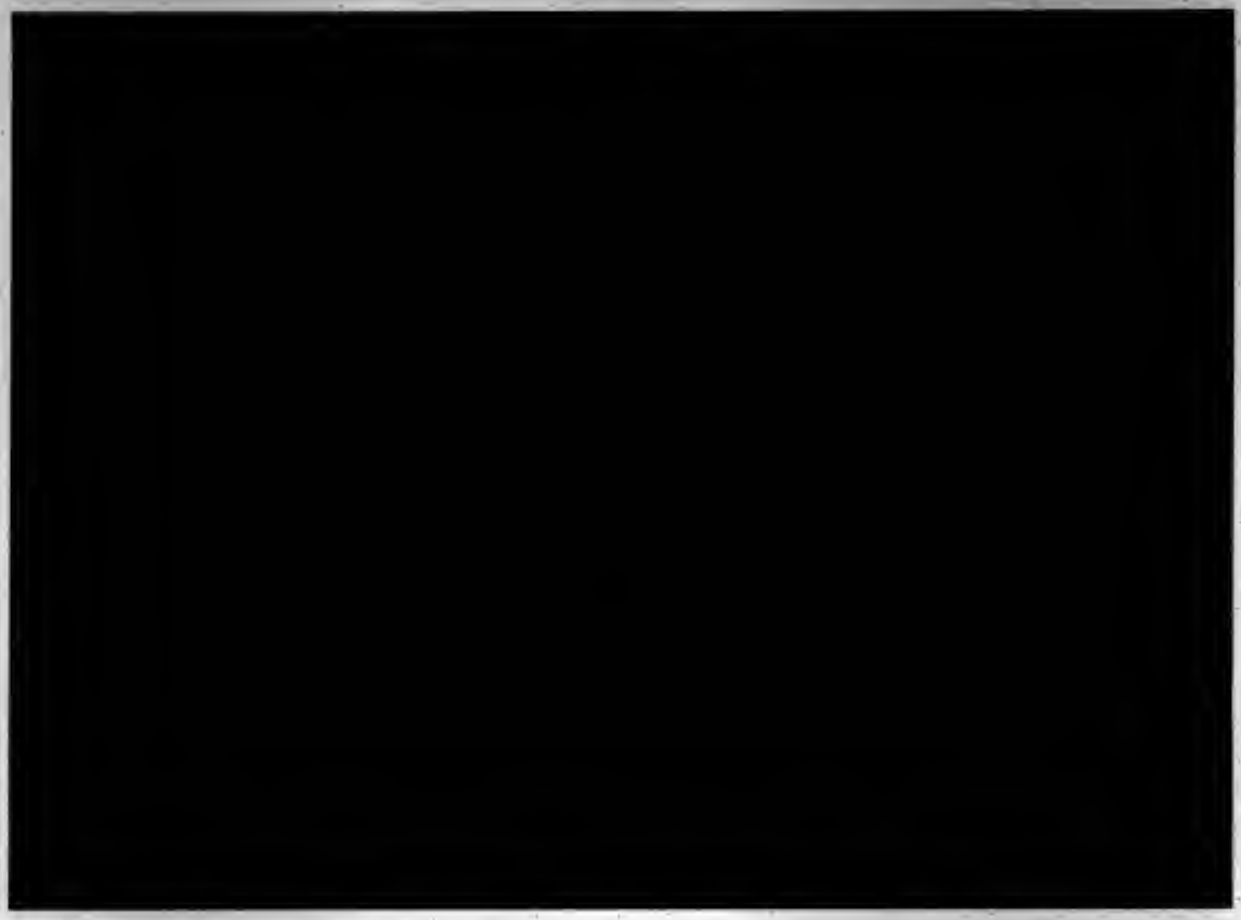
ABP mcc

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., Box 880, 375 Cochituate Road, Framingham, MA 01701.

Computerworld OA is a member of the CW Communications/Inc group, the world's largest publisher of computer-related information. The group publishes 44 computer publications in 18 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's *Computerworld/Argentina*, Australia's *Australasian Computerworld* and *Micro Computer Magazine*, Brazil's *DataNews* and *MicroMundo*; China's *China Computerworld*, Denmark's *Computerworld/Danmark* and *Mikro-Data*, France's *Le Monde Informatique*; Germany's *Computerwoche*, *Microcomputerwelt* and *PC Welt*, Italy's *Computerworld Italia*, Japan's *Computerworld Japan* and *PC Japan*, Mexico's *Computerworld/Mexico*; Norway's *Computerworld Norge* and *MikroData*, Saudi Arabia's *Saudi Computerworld*; Spain's *Computerworld/Espana* and *MicroSistemas*; Sweden's *ComputerSweden*, *MikroDatorn* and *Min Hemdator*; the UK's *Computer Management* and *Computer Business Europe*; the U.S.' *Computerworld*, *Desktop Computing*, *Hot CoCo*, *InCider*, *InfoWorld*, *MICRO MARKETWORLD*, *Microcomputing*, *PC World*, *Run* and *80-Micro*.

OA FOCUS

DEPARTMENTS



FORUM

HAMMERING IT OUT

By Michael Hammer

"Hammering It Out" will be a regular feature in Computerworld OA *and will attempt to give readers a look at the lighter side of the developing world of office automation.*

The latest outrage being perpetrated on the English language is the practice of turning nouns into verbs ("finalize," "prioritize" and so on). Regrettably, the office automation field is not immune from this lamentable phenomenon. ("messaging," "windowing" and "interfacing" are three favorites). It is time to counterattack. A good place to begin is with the neologism, "calendaring," and its referent, the electronic calendar.

The electronic calendar is truly a triumph of modern technology. A user can actually enter appointments for specific dates and times, inspect the calendar for a particular date or even have his day's schedule printed out. It is safe to say that an electronic calendar is almost as useful as the *Economist* diary I carry in my jacket. I say "almost" because no electronic calendar fits in my pocket, and when someone stops me in the hall (or on the road) to see if I am free on the 18th of next month, I do not want to start looking for a terminal. Using an electronic calendar for personal scheduling appeals to the same people who balance their checkbooks on a home PC.

But, you say, I am being unfair. The virtue of a calendar is as a group scheduling tool. In theory, everyone in the organization will keep his calendar on-line; then, anyone who needs to schedule a meeting will need only to inspect the attendees' calendars to find a mutually convenient time slot. (Perhaps in the interest of public

Do You Like OA?

If so, write and tell us. If not, tell us about that, too. Send comments to The Editor, *Computerworld OA*, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

You can also subscribe to OA for $12 a year by calling CW Circulation, 800-343-6474. CW subscribers will continue to receive issues as part of their subscriptions.

decency, censored versions of their schedules will be shown, indicating only what time is free and what is available.)

However, the reality is somewhat different. Although all are invited to put their schedules into the system, the intended users quickly begin to have second thoughts: "You mean my boss will be able to look at my calendar? He's going to see that I don't have anything scheduled for Thursday? Maybe he'll think I'm not doing anything on Thursday. Maybe he's going to find something for me to do." Or, "Harry is going to see I'm available on Friday from 3 to 5? I hate Harry and his idiotic meetings! I want to tell Harry I'll be in Peru on Friday."

Within 30 microseconds of system installation, all calendars are blocked out until the year 2146.

As a result, hardly anyone uses electronic calendars, even the vendors that tout them so highly. One manager I know recently visited a major OA vendor's headquarters, where he was treated to a demonstration of the latest integrated product offering. George, the demonstrator, extolled the virtues of the calendar facility and claimed that his entire organization used it to schedule all their meetings. Just then George's boss stuck his head in to say, "George, I'd like a staff meeting tomorrow. Are you free at 10?"

The sad truth is most electronic calendars provide very little value to their users and the overhead associated with using them dwarfs their putative benefits. Conventional electronic calendars violate the first rule of OA system design: An electronic system must be better than the paper system it is intended to displace. Simply simulating paper with electronics is pointless.

The originator of the electronic calendar ranks up there with the genius who thought it would be clever to employ a large, bit-mapped screen to represent a paper-covered desk — right down to stacks of documents piled on top of each other.

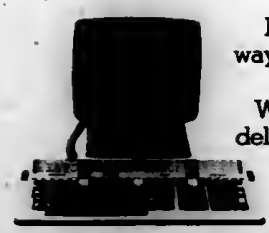
This is not to say that electronic calendar systems are entirely useless. A number of organizations have found on-line calendars very useful for managing the schedules of inanimate objects — conference rooms, corporate aircraft and boards of directors. But for personal calendars, a pocket diary does very well and an electronic mail system can go a long way toward solving group scheduling problems.

A really useful calendar system would allow users to describe the priorities of their existing engagements and the urgency of meetings they are trying to arrange. Individual calendars would remain entirely private; only a scheduling process could inspect them, not other users. The scheduler would exercise intelligence to propose overriding an existing meeting. ("A two-hour meeting with all seven attendees is not possible until July; however, a two-hour meeting with six of them can be scheduled next week and a one-hour meeting with all of them tomorrow.")

Unfortunately, such capabilities are not yet available. Until they are, we may be better off without electronic calendars; we will certainly be better off without "calendaring"! OA

Hammer is president of Hammer and Co., Inc., a Cambridge, Mass., consulting firm that specializes in the strategic implications of new information technologies.

WITH DATA GENERAL, YOU WON'T BE A PRISONER OF YOUR IN-BOX.



DATA GENERAL INTEGRATED OFFICE AUTOMATION

Burying information under a ton of mail at the bottom of your in-box is not the best way to get it when it's critical to a decision.

ELECTRONIC MAIL

With Data General's CEO® Comprehensive Electronic Office, information is delivered electronically. Instantly. Unerringly.

But that's only the beginning.

TOTAL OFFICE AUTOMATION

The CEO system automates just about everything in your office. CEO electronic filing files the way you do. Its electronic calendar keeps tabs on trips, appointments, and meetings—even confirming them all.

Of course, CEO includes easy-to-use word processing. And all this is integrated with data processing for total decision support.

DON'T DUMP YOUR EXISTING EQUIPMENT

Best of all, instead of having to dump your existing equipment to automate your office, you can build the CEO system around it.

Because it not only ties in with other Data General computers, but it also ties in with the most widely-used mainframe and word processor.

Instead of just a series of personal computers, each CEO workstation becomes part of a global network, with access to data from IBM mainframes.

AS LITTLE AS $5,000 A WORKSTATION

And with the CEO system, the cost per workstation can be as low as $5,000, depending on application.

CALL NOW

For more information on office automation that's a generation ahead, call: **1-800-554-4343, Operator 05A** or write Data General, M.S. CEO 05A, 4400 Computer Drive, Westboro, MA 01580.

Data General
a Generation ahead.

OA NEWS

AT&T Moves In

No sooner had the bell rung on divestiture than AT&T was out of the gates. The newly liberated AT&T Information Systems, with an eye on the lucrative office automation market, has already announced several agreements with computer manufacturers, and many more are expected in 1984.

Within days of the official divestiture date, AT&T bought 25% of Olivetti Co., Europe's second leading information processing company. The deal raised eyebrows in Europe because it positions AT&T and Olivetti to take on IBM on the Continent. AT&T and Olivetti have indicated they will begin exchanging products for sale in their respective markets by mid-1984. AT&T will reportedly import Olivetti workstations for incorporation into its OA strategy.

The ink on that deal had hardly dried when AT&T announced an agreement with Convergent Technologies, Inc. in Santa Clara, Calif. Convergent, the agreement stated, will design and produce new workstations exclusively for AT&T Information Systems. Although neither company would discuss the agreement, analysts predicted that the resulting product would be a state-of-the-art workstation combined with a vast array of telephony features that would allow access to all tools needed in an average office.

Mike Dunmire, an analyst with the Seattle investment banking firm of Cable, Howse & Ragen, said it is quite possible the product will be integrated with Convergent's Megaframe product line. "The options AT&T has with Convergent are limitless," he added.

Dunmire pointed out that AT&T wanted a state-of-the-art product and, though they could have developed it in-house, the question was when? "The management of AT&T deserves a lot of credit for being so enlightened. They saw that Convergent's products were innovative and not 'me-too' technology. It took a lot of guts for AT&T to bite the bullet and look outside." As AT&T broadens its office scope, analysts predicted as many as 30 product announcements this year.

FCC Delays Charges

WASHINGTON, D.C. — The Federal Communications Commission (FCC) bowed to public and congressional pressure and delayed until next year the proposed long-distance access charges that AT&T had hoped to institute in April. The access charges, which were to be imposed on both residential and small-business telephone customers, have been a political football for several months as Congress, the White House and the FCC have gotten into the fray.

The charges, which were slated to be $2 per month, will instead be phased in gradually until 1990 and will go no higher than $4 per month. The FCC did allow $6-per-line charges for big business customers to go into effect as scheduled in April. Both the House of Representatives and the Senate have opposed the access charges. The House bill, H.R. 4102, passed last November blocked the FCC plan by exempting residential and small-business customers from the fees. A similar bill was awaiting approval in the Senate. The Reagan administration had opposed both of those measures, but expressed agreement with the FCC's decision to delay the charges. Analysts felt the White House was happy to have the decision delayed until after the election.

The commission's ruling means that charges that would have been paid to local phone companies could be delayed until spring or summer of 1985. The ruling also means that there will be no reduction in interstate long-distance rates as originally promised by AT&T. The company, after its Jan. 1 divestiture, had planned to reduce its long-distance rates by 10.5% and was counting on the access charges to help defray the costs of that reduction.

If You Knew Unix . . .

The major office vendors had taken a hard line against it, but Unix, Bell Laboratories ever-present operating system, appears to have overcome even its most stubborn opponents. Taking an "If you can't beat 'em, join 'em" approach, IBM, Digital Equipment Corp., and Wang Laboratories, Inc. have all announced Unix-like operating systems for different parts of their respective product lines. AT&T, meanwhile, made it clear through a series of January announcements that it intends to make Unix an industry standard.

Whether Unix becomes the de facto operating system for the office remains to be seen; one thing is clear, however: it is no longer possible for any serious office vendor to ignore Unix altogether.

Among the first to come over was Wang, which in October announced its UVS, an operating system environment integrating Unix System V software with the Wang VS operating system. IBM recently unveiled its Personal Computer Interactive Executive (PC/IX) Unix-like product for its Personal Computer. The IBM offering, developed by Interactive Systems Corp. for IBM and scheduled for April, reportedly will be used for program development, text processing or running a wide variety of existing Unix-system application programs.

Last month, DEC announced Ultrix-32, a new native-mode implementation of Unix for its mid-range and high-end VAX computers. The product is based on the University of California at Berkeley's Fourth Berkeley Software Distribution and is scheduled for delivery in late spring.

Within days of the DEC announcement, AT&T, Unix' creator, unveiled an enhanced version of Unix System V as well as three new software packages designed to run under Unix for a broad range of applications. AT&T also announced a cooperative relationship with Digital Research, Inc., creators of the CP/M operating system, to expand the number of industrywide applications software offerings supported by Unix.

Apple's New Crop

CUPERTINO, Calif. — Whatever the computer industry thinks of Apple Computer, Inc., one thing is certain: it sure is a tough company to ignore. A year ago, the industry was abuzz with the introduction of Lisa, Apple's innovative 32-bit desktop computer. This year, the Macintosh has generated enough ink to start a printing company.

The early reviews on Macintosh, a smaller, less-expensive, scaled-down version of Lisa, have been almost unanimously favorable. But Lisa herself was also the object of lavish praise, and when the final numbers were in for 1983, Lisa had been a major disappointment for Apple.

The Macintosh costs $2,495 and is available now; it should avoid the pitfalls that plagued Lisa. Industry analysts feel it could give IBM a run for the money; one predicted first-year sales of more than 350,000 units.

Apple is reportedly betting the company on the success of Macintosh and spending a reported $50 million on advertising for the product in 1984. John Sculley, Apple's energetic president, has said the Macintosh is "the key to our office products line for the rest of the decade," which brings up the question of just how viable it is as an office product.

The Macintosh, based on a 32-bit 68000 microprocessor, comes with 128K bytes of random-access memory, 64K bytes of read-only memory, a black-and white 9-in. monitor and a single 3½-in. Sony microfloppy-disk drive with 400K-byte storage capacity. Mac features Lisa's user-friendly interface with mouse, so end users can reportedly be up and running in two to three hours. At just 10 inches of desktop space and a weight of just 17 pounds, it is portable in its manufacturer's eyes.

Apple has indicated it is working on AppleBus, an interconnect product that will allow Macs to be hooked to each other as well as to other Apple products. The Macintosh also has two RS-232 serial ports for connecting a modem.

Aaron Goldberg, an analyst with the International Data Corp. (IDC) in Santa Clara, Calif. said, "The office will be the toughest market for the Macintosh because of IBM's presence. At the same time, however, it should do quite well because it's so easy to use and it doesn't take up much room."

Tom Willmott, IDC's director of user research, added that though communications is still a question mark, the Macintosh is positioned for the office better than the Apple IIe or the Lisa. Depending on the amount of application software developed, he foresees the Macintosh as a far better alternative as a low-end workstation than the IBM PCjr. "Apple has blown IBM out of the water on this one," Willmott stated.

Amy Wohl, president of Advanced Office Concepts, pointed out that since Macintosh is not based on the MS-DOS operating system, software availability could become a problem. Large companies that are committed to an MS-DOS environment might shy away from the product.

Apple, even with the Macintosh, does not yet offer a system solution and that could hinder office sales, especially to large corporations. Wohl questioned whether large companies would now be willing to accept Apple. "There are some real doubts about that; they haven't sold well in that environment," she said.

The Apple Macintosh

OA BRIEFS

MAYNARD, Mass. — It was shaping up to be the winter of its discontent until Digital Equipment Corp., which had announced sharply lower first-quarter earnings, bounced back with stunning quickness. DEC, whose stock plunged more than 30 points after the October announcement, shocked Wall Street analysts in January when it reported a 31% increase in second-quarter earnings to nearly $80.5 million, or $1.41 per share. Revenues for the quarter ended Dec. 31 rose 40% to $1.4 billion compared with $1 billion for the same period a year earlier. Analysts had not expected DEC to recover from its financial woes so fast and had predicted second-quarter earnings of about 65 cents per share. The surprise announcement sent DEC stock soaring nearly as quickly as it had fallen in October. Within three days of the announcement, the stock had risen 17 points to more than $90 per share.

BOSTON — Microcomputer managers in Fortune 1000 corporations now have a place to turn to find out how their contemporaries are confronting the changes that microcomputers are bringing to their respective organizations. Beginning last month, a network of microcomputer managers was made available by the Microcomputer Managers Association (MMA) of Boston. The network reportedly allows an "exchange of information to the benefit of all subscribers," according to Marty Butler, president of the MMA.

The membership fee for the network is $150, MMA said from 60 Boylston St., Boston, Mass. 02116.

WELLESLEY, Mass. — Workstation shipments to executive and middle management markets are expected to increase from 48,000 in 1983 to more than half a million in 1990, an annual growth rate of more than 40%, according to a survey done by Venture Development Corp. (VDC).

The VDC report, "U.S. Executive Workstation Markets 1983-1990," points out that when first introduced in the late 1970s, executive workstations were unable to generate broad interest, but that the tide has turned. Growth in annual shipments is starting to increase dramatically. The report breaks the market segment into four categories and predicts the most noticeable growth in sales of data-only workstations for middle managers. The study is available for $2,950.

In a separate study, VDC also predicted that worldwide shipments of printers and plotters by U.S.-based manufacturers will reach $8.5 billion in 1984. "The U.S. Computer Industry" forecasts shipments of every major computer product including printers.

It is available for $1,050 from VDC, One Washington St., Wellesley, Mass. 02181.

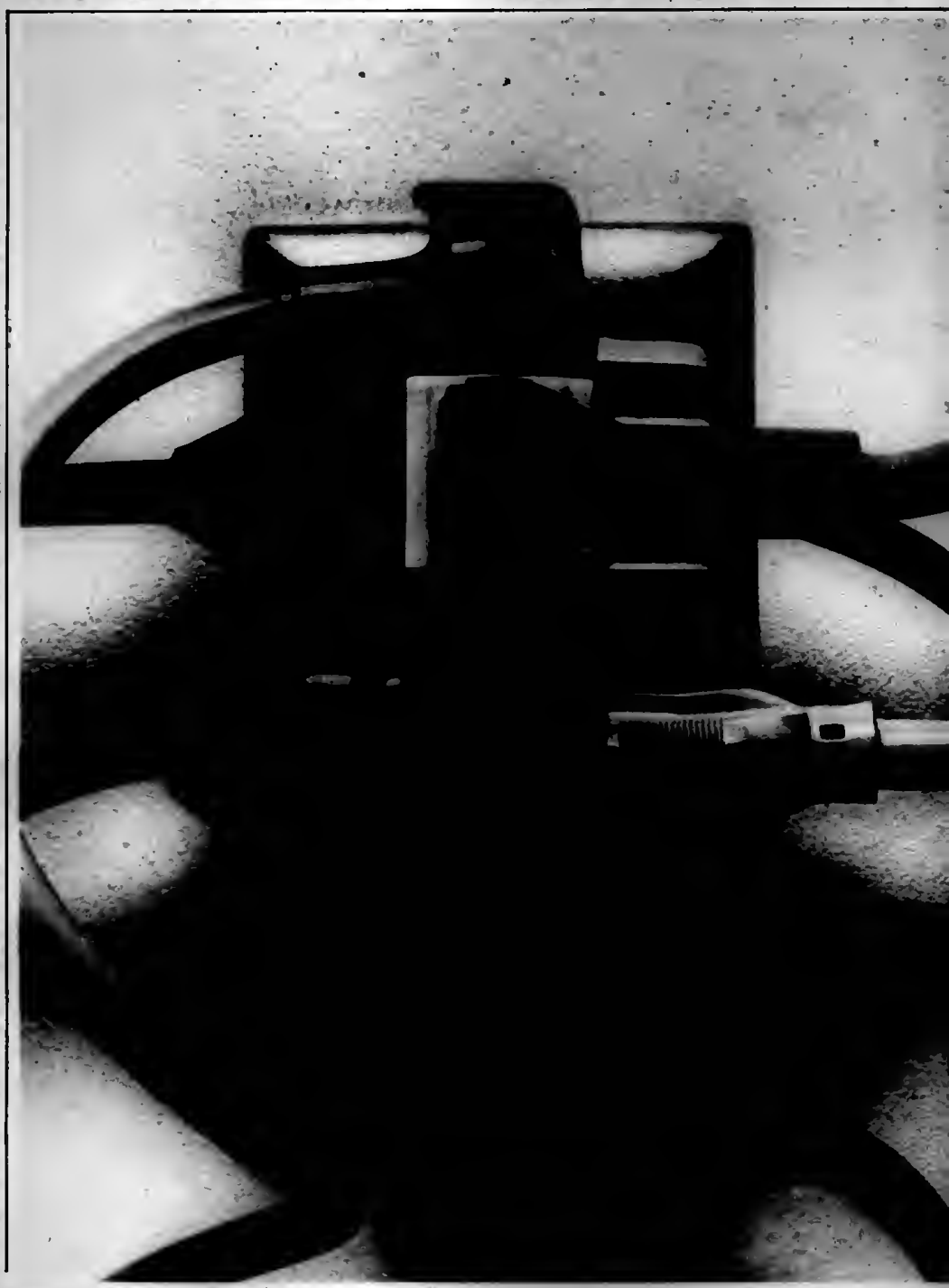
NEW YORK — Franklin Computer Corp., the Cherry Hill, N.J.-based computer manufacturer, agreed to pay Apple Computer, Inc. $2.5 million in lieu of continuing its court battle over the use of Apple's operating systems and computer programs.

In dropping the legal fight, Franklin agreed to accept the validity of Apple's copyright claim on its operating system software and to stop copying Apple programs for its Apple-compatible computers.

As part of the settlement, Franklin was given until April 1 to stop manufacturing computers with software reportedly copied from Apple.

BETHESDA, Md. — "Our economy has entered an era in which information and knowledge have immense value in and of themselves. For managers, this information age will create profound changes in the way they make business decisions. It will also mean new kinds of decisions — on computers, telecommunications, word processing, micrographics, electronic mail and teleconferencing."

With this in mind, the International Information Management Congress (IMC) is



OA BRIEFS

distributing a new book, entitled *The Executive's Guide to Information Technology: How to Increase Your Competitive Edge*. According to the IMC, the book looks at the "big picture" to information technology. It addresses the question of how today's technology can help managers do their jobs better and increase their company's competitive position. The 314-page book is available for $30 from the vendor, IMC Publication Sales, P.O. Box 34404, Bethesda, Md. 20817.

NORWALK, Conn. — Micro-to-mainframe communications products and services have entered a period of "explosive growth," according to a research report from International Resource Development, Inc. (IRD). The report predicts users will spend more than $500 million on micro-to-mainframe communications in 1984 compared with $220 million in 1983.

The report, "Micro-to-Mainframe Communications — Hardware and Software Markets," is available for $1,850 from IRD, 30 High St., Norwalk, Conn. 06851.

NEW YORK — "VDT News," the first newsletter to report exclusively on video display terminal operator health and safety began publication last month.

The bimonthly newsletter will be available for an annual rate of $18 for individuals and $35 for institutions from VDT News, P.O. Box 1799, Grand Central Station, New York, N.Y. 10163.

WASHINGTON, D.C. — A federal advisory committee for the airline industry has begun studying the potential problems caused by high-technology devices such as portable computers on board airplanes. The report, "Potential Interference to Aircraft Electronics Equipment from Devices Carried on Board," is the result of the first meeting of the Radio Technical Commission for Aeronautics (RTCA) held last November.

The RTCA was approached by Eastern Airlines to investigate the situation and plans to look first into how the passenger-operated devices affect the aircraft antennas.

NEW YORK — Huttonline, an electronic information service that will enable clients to access the firm's computers for personal account data, investment information and electronic mail, was introduced by E.F. Hutton & Co.

Huttonline reportedly gives clients instant access to account information, such as portfolio positions and market values, cash and margin balances and open orders. It also shows the client's transaction activity and makes available research information, market comments, and other investment information.

According to the company, any E.F. Hutton client is eligible to subscribe to Huttonline and the service will initially be available between the hours of 6 a.m. to 12:30 a.m. EST, seven days a week. The service will be available for a sign-up fee of $25 and a monthly service fee of $17.

Hutton also announced that it is getting into the computer business by offering selected personal computer equipment to its clients in conjunction with Huttonline.

ANN ARBOR, Mich. — Comshare, Inc., the Michigan-based software maker, has signed a two-year agreement with IBM which will pair the two in selling decision support system software for use in IBM information centers. It is the first time IBM has signed such an agreement with a DSS vendor.

According to the agreement, IBM and Comshare field representatives will work together in situations where a DSS is needed, and IBM will recommend Comshare's System W and Micro W DSS software. The agreement also called for the two companies to work together on future improvements of System W to support new relevant hardware and operating software releases. OA

OA Q&A

Steven M. Abraham, conference chairman for the Office Automation Conference (in Los Angeles, Feb. 20-22) is senior manager for Price Waterhouse & Co.'s Management Advisory Services and responsible for its office systems consulting practice. He discussed some major questions facing the OA community in '84.

What are the key issues in OA as we go into 1984?

We're on the verge of embracing this technology on a very large scale. The PC trend will continue and expand beyond just those stand-alone desktop devices. It will expand because senior management is now touching and feeling the technology and getting direct experience with it. That wasn't true two to three years ago.

What will the key technology trends be?

One of the biggest areas of advancement in 1984 will be in decision support. These packages are becoming more sophisticated, integrating with mainframe-based data base systems and with data base packages, text-processing and graphics.

People are crying to get at the masses of data corporations have built in these odd file structures over the last 20 years. They are eager to get at the information in a format and time frame of their choice and to be able to portray it in the style of their choice.

Who will be the key vendors this year?

AT&T and IBM. What's really clear is that AT&T intends to get into all the businesses IBM is in, except for mainframes. And IBM intends to get into the PBX business. It will be be fascinating to watch over the next two years. Most Fortune 500-type corporations have a major investment in both these companies, and that makes the situation very different from saying, "Who should we pick for our OA vendor?" They already have those two companies as major vendors, so major decisions about OA could involve either one.

How far has OA really come?

It's still in its infancy in most organizations I've seen. I have a client right now, a multibillion-dollar company, with virtually no decentralized OA. It's just now getting around to figuring its strategy and making an investment. Most companies that size have done more, but I don't have a client right now that I'd consider sophisticated or advanced. We're not talking yet about fully integrated systems and strong integration with the mainframe environment. That is still mostly in the talking and planning stages.

Will we see dramatic movement in '84?

Not dramatic; I see a gradual buildup. The ideal environment won't develop for several years. The only ones who've really attacked this thing are vendors and a few leading-edge users. The magnitude of the issue has grown so that most if not all organizations of any size are doing something about it now. That process will lead them to making strong advances over the next few years. But the planning process has been going on only a year, if that long.

Is the resistance coming from the clerical level or from management?

Resistance at the clerical level is a nonissue. And at the upper levels, it's not resistance so much as a lack of awareness, a lack of education, a lack of impetus, a lack of involvement by senior management, a lack of risk-taking on the part of OA managers and a lack of involvement of DP organizations. These are all changing over time, and that's where you'll get the critical mass to make things really happen.

What will come out of all this in five to 10 years? What will the office of the future look like?

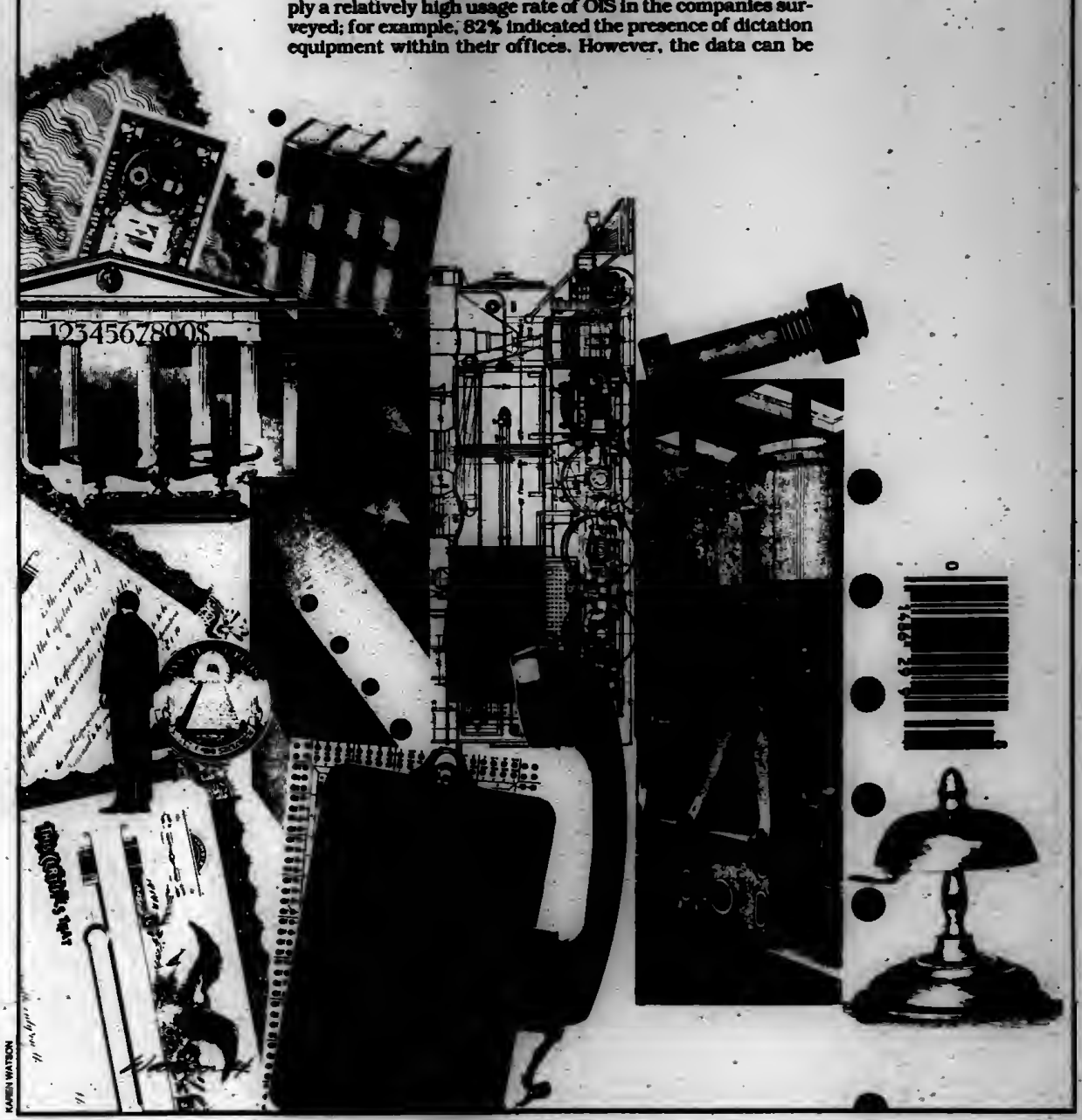
I don't pretend to know all the answers. The only thing constant in this industry is dramatic change. Anything I say is going to be wrong; the rate of change is just too great. But from what I know today, by 1990, you'll see the workstation become ubiquitous, not to the extent the telephone is, but tending toward that. We'll see the communications equipment integrated with workstations and that in itself will bring the devices to the desktops of executives and managers. OA

THE STATE OF OA

BY STEVEN R. DZUBOW

One way OA planners can come to grips with the ever-elusive office of the future is to find out how other users are approaching OA. Five hundred users of office technology recently participated in a survey designed to profile the state of OA in the U.S. today. These responses, presented in summary form here, are indications of what other managers are doing.

The most visible indication of the integration of office information systems into the work place is the inventory of hardware. Figure 1 on Page 10 gives a brief view of the OA products in use today. At first glance, the data seems to imply a relatively high usage rate of OIS in the companies surveyed; for example, 82% indicated the presence of dictation equipment within their offices. However, the data can be



KAREN WATSON

misleading: it is important to remember that other studies have pointed out that fewer than 10% of office workers use their available dictation equipment on a regular basis.

Again, although 88% of our respondents indicated a presence of word processing stations, most companies with word processors state the equipment is significantly underutilized. Similar patterns of equipment usage also apply to the other categories of office equipment.

With Equipment	Office Equipment Type
88%	Word Processing Stations
83%	Copiers
82%	Dictation Units
53%	DP Computer Terminals (exclusive of WP)
46%	Microfilm/Fiche Readers
39%	Message/Teletype Stations
36%	Facsimile
31%	Small Business Computers (exclusive of WP)
19%	Phototypesetters
16%	OCR Equipment

Figure 1. Office Equipment Integration

This ever-widening gap between equipment and utilization is to some extent a result of business' preoccupation with and enamourment of state-of-the-art technology at the expense of the worker. Although the technology is available today to make significant increases in workers' productivity, the deemphasis of "people problems" has prevented workers from achieving these benefits.

We have been through this before. Initially, computers were placed into glass-walled showplaces and used as expensive calculators. It has taken almost three decades for business to realize the computer's real potential. The evolution from DP, to management information systems and finally to decision support systems has been a slow process.

This problem is much greater in the OA environment than it was with general-purpose computers. A larger number of employees are directly affected. The gap between equipment and utilization also severely hampers firms that want to experience the full extent of benefits associated with the technology.

Most OA systems are maintained independently rather than as part of a distributed network; they are owned, not leased or rented. A strong tendency exists to separate DP from other OIS functions, such as WP. This tendency is apparent in the maintenance of separate personnel — one group supports DP, others support OA functions.

A balance also exists between:

- Customized and off-the-shelf systems.
- Decentralized and centralized systems.
- Single-vendor and multiple-vendor systems.

Most organizations are still in the evaluation stages of OIS; they are experimenting with various prototype configurations to determine the best alternatives for their business environments.

Based upon the survey data, three distinct stages exist:

Stage I. This is the earliest stage of OIS development. It encompasses the basic technologies of WP, dictation and microfilm, which are usually the first to be integrated into the automated office.

Stage II. The middle stage of OIS development, Stage II encompasses more sophisticated electronic technologies such as electronic mail, electronic filing and teleconferencing. An organization usually builds upon its Stage I experiences before moving into Stage II.

Stage III. In the advanced stage of OIS development, Stage III technologies are those required for direct augmentation of the manager. Although stages I and II directly support the manager to some degree, most technological interfacing can be accomplished by secretarial and administrative personnel. Stage III requires the integration of DP and OIS as well as the automation of management support functions.

Figure 2 on page 12 indicates the degree to which respondents have progressed into the various stages, and Figure 3 presents the extent of operating experience respondents have achieved in the various stages of development.

More than half the respondents (56%) have actually achieved op-

erating experience with Stage I office technologies. Fewer than 15% have had operating experience with Stage II and Stage III technologies. Of those respondents having operating experience, fewer than 5% have more than three years' experience in the first and second stages. Considering that the technology within these stages has been in existence for more than 15 years, its relatively slow integration into the office is surprising. The delay can be blamed in part on the previously mentioned equipment-utilization gap.

Figure 4 on Page 12 indicates the primary motivators for OIS, as well as the degree to which benefits were achieved using office systems. One interesting response was the last-place ranking of revenue generation, the benefit that would seem to have the greatest potential for the organization.

Respondents at all levels had a moderately positive attitude toward OIS. This attitude held when the accomplishment of OA objectives was compared with organizational expectations. On the average, all levels believed the accomplishments were slightly better than they had expected.

The ranking order is analogous to that associated with the early developmental stages of computers. It was no surprise that increased productivity and improved quality of work were both the primary motivators and the primary benefits of OIS. A further analysis of these two categories by personnel job position shows that the major gains in productivity and quality of work were achieved at the secretarial-clerical level, followed next by professional-staff (nonmanagement), middle and line management and, last, upper and executive management.

A positive correlation existed between degree of benefit achievement for these categories and the existence of quantitative

The Survey

This article is a summary study based on a survey sent to 5,000 users of office information systems. From that population, 500 usable returns were obtained.

The largest number of respondents, 41%, represented firms whose revenues totaled $5 million or less. The next largest group, 26%, came from firms with revenues between $5 million and $50 million.

The third largest group, 18%, represented firms with revenues between $50 million and $500 million. The remaining 15% came from firms with revenues in excess of $500 million.

The respondents represented a diverse group of interests and a representative sample of U.S. organizations.

The majority, 27%, were in the financial, legal and insurance industries; the next largest group, 25%, represented education, government and research and development; another 24% were in advertising, engineering, medicine, general business and transportation and utilities; 17% were in manufacturing; and the remaining 7% represented wholesaling and retailing.

In terms of organizational hierarchy, more than 17% of the respondents were upper or executive management; 33% were middle or line management; most were professional and nonmanagement; and fewer than 5% were administrative or secretarial personnel.

Almost 70% of the [illegible] participated in the [illegible] of office [illegible] guidelines or [illegible] selection [illegible] or [illegible] were [illegible]

Table I on [illegible] the kinds of [illegible] used and gives the percentage of users that [illegible] in each category.

Development Stage	Planning/ Evaluation	Implementation/ Prototype Operation	User Experience Achieved
	(Percentage of Respondents)		
I	34%	10%	56%
II	74%	14%	12%
III	65%	22%	13%

Figure 2. OIS Stage Progressions.

Development Stage	No experience	Less than 2 years	1 to 3 years	More than 3 years
I	15%	10%	22%	53%
II	16%	18%	8%	5%
III	64%	21%	10%	5%

Figure 3. Percentage of respondents with OIS stage experience.

measurements for the various job positions. Most organizations (78%) had quantitative measurements related to productivity and quality of work at the secretarial and clerical levels. At the professional and staff level, however, only 50% had developed quantitative measurements. This figure fell to 42% at the middle and line management level and even lower, to 30%, at the upper and executive management levels. This perhaps is because the job position becomes increasingly intangible as one moves into the organizational hierarchy. Nevertheless, it should be possible, even at the upper levels, to measure performance so that progress could also be measured. In fact, some type of quantitative measurement must be developed at all levels of the organization to establish goals and objectives and to reduce the subjectivity that exists at the higher levels.

In terms of benefit achievement, the most successful organizational function was administrative services, followed by accounting, marketing, finance, legal, personnel, R&D, planning, engineering, purchasing and medical. It is not surprising that these functions, which typically have the largest composition of administrative and secretarial staff, ranked highest. Most organizations are in Stage I of OIS development, where most of the technology is targeted toward direct support of administrative and secretarial staff.

Responsibility for overall OA planning and operations resides in a centralized group in 69% of firms responding. Figure 5 breaks down these responses by group.

The distribution of OIS responsibility reflects the predominant OIS stage of development. As organizations move into stages II and III, DP and MIS, followed by autonomous OA groups, will increasingly be responsible for OIS planning and development. Administrative services will probably continue to play a strong role, particularly in operational management. The existence of a centralized coordinating OIS group also seems to increase the likelihood of OA success. This finding seems to be due primarily to better standardization policies and the existence of a corporatewide information clearinghouse to reduce problem duplication.

A second organizational factor related to OIS success is the existence of formalized policies, guidelines and standards. Fewer than half (46%) of the respondents indicated the existence of formalized OIS policies. Only a third indicated the existence of formalized OIS guidelines (34%) and standards (31%). No wonder OIS success has been somewhat limited! Until formalized policies, standards and guidelines are the norm, OIS development and implementation will continue in an ad hoc, uncoordinated fashion. Serious problems, particularly in the area of hardware and software compatibility, could occur in stages II and III when organizations move toward OIS integration.

A third factor related to OIS success is the degree of commitment by upper and executive management. Only 38% of the upper and executive managers and 34% of the middle and line managers participated to any significant degree in the establishment of OIS objectives. In addition, only 18% of executive management and 24% of line management participated to any significant degree in the evaluation and design processes associated with OIS. The limited commitment of management in the early stages of OA planning and development is definitely reflected in the benefit levels respondents attained.

Only 7% of the respondents believed current OA products totally met their organizations' needs. The majority of the respondents (55%) indicated that the office systems mostly met existing needs. The remaining 38% stated that their needs were being only partially satisfied.

Primary reasons cited for this attitude were that the products were beyond present needs (36% of respondents); products were lagging behind present needs (32% of the respondents); equipment costs were too high (33% of the respondents); equipment was not sufficiently reliable (16% of the respondents); and the equipment was too complex (11% of the respondents).

The above statistics again point to the presence of the equipment-utilization gap. Except for the above problems, respondents at all organizational levels had a moderately positive attitude toward OIS. This unanimous positive attitude held when the accomplishment of OA objectives was compared with organizational expectations. On the average, all levels of personnel believed the actual accomplishments were slightly better than the expectations each had for OIS.

Respondents identified five factors as most important in the selection of OIS vendors. In order of importance, they were equipment reliability, equipment quality, quick response to customer needs, field service support and technical support services. All factors involve maintaining the equipment in an operational mode. Of the 20 factors identified, vendor reputation and equipment price ranked respectively 10 and 15 in order of importance. In addition, completeness of office equipment product line ranked 16.

The data seems to indicate that OIS buyers are becoming more sophisticated. They are no longer dependent upon a single vendor for product support, and they are willing to pay additional premiums for equipment so long as such payment can be cost-justified. By far the greatest influence on the equipment purchase decision is exerted by discussions with experienced colleagues. Industry publications and professional magazines rank second; vendor publications, educational institutions and the general media influence the purchase decision only to a limited degree.

In a similar finding, experienced OA users provided the most benefit to respondent organizations in terms of achieving OIS objectives. Vendors and manufacturers ranked second in terms of providing positive assistance, followed by courses and seminars, professional OA associations and independent consulting groups. About 50% of the respondents said independent consultants either were not helpful or actually caused problems for a firm trying to achieve its OA objectives.

More than 85% of the respondents planned either to upgrade or to add new Stage I equipment within the next fiscal year. Over 40% are planning to implement some aspects of the Stage II and Stage III technologies into their organizations over the next two- to three-year time frame. Almost one-third (31%) expected their cumulative investment in OIS to increase significantly over the next three years. Approximately 48% of the companies believed a moderate increase in OIS expenditures would occur, and only 7% anticipated a decrease in their OIS budgets in the near future.

In spite of the limited success experienced by users, respondents were generally optimistic about the future of office systems. The data indicates that most organizations are spending considerably more time today than they did in the past in the planning and requirements phases of OIS development. This initial emphasis upon the critical aspects of OIS will have a positive effect upon the attainment of goals and objectives in the office of the future. OA

Dzubow is professor of administrative sciences at St. Joseph's University in Philadelphia and author of the survey cited in this article.

Motivator Rank	Motivator/Benefit	Benefit Rank
3	Cost Reduction	4
4	Cost Avoidance	6
8	Revenue Generation	8
5	Improved Communication	5
6	Improved Morale	3
1	Increased Productivity	2
2	Improved Quality of Work	1
7	Improved Career Patterns	7

Figure 4. OIS Motivators and Benefits.

Function	Percent of Respondents
Administrative Services	45%
Word Processing	22%
DP/MIS	19%
Autonomous OA Group	13%
Other	1%

Figure 5. OIS Centralized Responsibility.

DSS & DP: POWERFUL PARTNERS

BY PETER G.W. KEEN

The central issue for DP is information resource management. At present, information resource management is yet another of the buzz words and cliches that emerge in the management information systems field at random intervals. Cliches are unfortunate — they often disguise the intellectual core behind a phrase. This has happened to decision support systems and may well spell DSS' demise.

The question "What is the definition of DSS?" is asked, but the more important one may well be "Why is the term DSS used in such silly ways without even being defined?"

For information resource management to move beyond cliche, it needs a core of intellectual toughness. To some extent, a clear concept of information resource management constitutes the organizational infrastructure not just for DP, but also for DSS and office technology.

Until recently, information has not been a real resource in most companies. Rather, it has been only a fragmented collection of operational files and special-purpose data bases. For information resource management to be meaningful in both concept and practice, it needs to provide the same level of coordination, planning and methods used to manage the financial resource. In fact, information resource management translates to the creation of an equivalent to the financial planning and control function, headed by a chief information officer comparable to the chief financial officer.

The chief financial officer is responsible for guaranteeing the integrity of the financial accounting system, including planning and reporting. He also supervises the methodologies and frameworks for capital investment. The chief financial officer does not decide how managers should spend money. Rather, this person decides how the processes of financial planning, justification and decision making should be handled. The chief financial officer is responsible, too, for ensuring that the operations are consistent and based on proper assumptions.

Viewed from this perspective, information resource management is not about control of information. It is about certification, justification of procedures, creation of methodologies and data definitions equivalent to those of the financial accounting system. In effect, the chief financial officer has an architecture for handling the financial resource: a systematic blueprint of terms, procedures and structures. Information resource management is a parallel architecture. The chief financial officer does not control how people spend money. Similarly, it would be a dreadful mistake if information resource management were confused with control over the use of information.

The need for DSS to tackle the issue of organizational decision-making processes rather than just individual ones has become increasingly apparent. In addition, it must create the systems that contribute to ongoing planning, control and operations, rather than those that contribute only to specialized or ad hoc needs. DSS has built its identity largely by its deliberate contrast with and independence from DP. For the first time, it needs DP and has every reason to want information resource management to become a reality, not just a buzz word.

DSS offers DP an understanding of how to operate in a user-controlled world. DP offers authority and expertise to defining architectures. It is hard to see how either can really progress without integration of these assets and skills.

Refocusing DP's role really amounts to meshing authority and accountability, a process that has two parts. The first is providing the needed authority to implement the greatly expanded range of applications that information technology has stimulated. The second is to exercise a mandate to spread that technology across departments.

Until recently, DP reported to a staff executive several levels below the key authority figure to the organization. It had a narrow charter, and senior management played a limited role in planning. DP had certain territorial authority as a result of its monopoly over a resource that was not of central interest to the mainstream of the business. Its interpretation of its job focused on preventing disruption rather than on fostering innovation. Applications were handled on a project-by-project basis and largely affected only single departments.

The accountability needed by the information function is broadened by the cross-organizational applications of office technology and the use of terminals by customers, managers, secretaries and professionals to access services and products. DP is too narrow a term for this newer responsibility and set of skills.

Accountability must be backed by adequate authority. There has to be a clearer conception not of what to decide in the use of information technology, but rather of who decides. Planning, coordination and liaison become key, as do formal mechanisms for setting priorities and allocating resources. Pushing electronic mail capabilities, integrated communications or data management across, up and down the organization is impossible without authority.

Decisions on applications have been made by DP mostly because they were never very important. If technology becomes a key contributor to effectiveness and efficiency, there have to be mandates from the top.

DP now has the opportunity to use the concepts of information resource management and office technology to clarify the issue of the authority needed to manage such a resource. DP should look to become more of a staff function and should spend much less time being concerned about owning data centers and hardware. It should focus more on getting influence instead of on budgets. The model for this is again the chief financial planning officer, who certainly does not fight to control the tab machines. Too many DP managers are competing to build an empire that largely consists of carbon paper and tape reels. The aim of DP should be to get the kind of staff influence that financial planning officers have.

In essence, information resource management is a set of architectures for data and communications. The applications are a portfolio of opportunities. Because we now have disjunctive technologies, one group sells DSS, another runs office technology and each justifies applications from its technical perspective. With information resource management, one has a corporate resource and a set of business opportunities, defined in terms of investment, competitive impact, internal efficiency and effectiveness. Then and only then can one decide which part of the technology it would be best to use. We should not make the case for DSS in terms of DSS, but to terms of a productivity opportunity or improvement in the operations of the organization and then choose whatever piece of technology makes sense.

The meaning of all this is that the planning process is key. The bottom-up, project-by-project approach of DP needs to be meshed into a process of top-down integration. This again highlights the issue of authority, because doing this needs clear directions from the top. The difficulty is in putting priorities on, for example, electronic mail for increased horizontal communications instead of on financial planning languages for DSS. This is a business issue, not a technical one.

Top management has to play a more direct role. Does it prefer that information technology mainly be used to leverage the cost side of the business to make it more efficient? Or would it rather see it used to focus on support aspects of business activities more relevant to the revenue side? In some industries — banking and related financial services especially — competitive advantage increasingly depends on information technology, especially on data communications. In that case, the priority is to select applications that contribute to product innovation, service and marketing positioning. This priority may also provide a stimulus for DSS: improving the productivity of people whose productivity matters — senior managers, planners and financial analysts, for example. In a manufacturing company, where margins are squeezed by bad business conditions, the business priority might be very different; there, the answer might be to hold down costs, reduce head count and improve internal efficiency.

The same technical base leads to obviously different uses in these extreme examples. The choice cannot be made on the basis of "Here is one component of information technology; what can we do with it?" In DP, technology has too often pushed applications and not vice versa. DSS, perhaps luckily, has not really had a special technology to push.

Decisions on applications have been made by DP mostly because they were never very important. If technology becomes a key contributor to effectiveness and efficiency, there have to be mandates from the top. One of the biggest challenges for DP is to educate top management to understand how to provide much more precise criteria for selecting a portfolio of applications.

This means that the main question is how to redefine the management structure for DP. This is not something that can be done unilaterally. DP needs an increase in authority, with much more focus — not on being a plant manager, but on building an information company. It will have a corporate planning arm, a technical services and marketing.

The role of the business-oriented systems analyst is clearly much more that of an industrial salesman bringing services and products to a growing range of customers and vice versa. DSS builders are first-rate industrial salesmen. They bring technology to the marketplace and the marketplace to the technology. If we solve the problem of the management structure of DP, then we have integrated office technology, DSS and DP and provided a base for creating real business value from them.

There is no technical fix to evade the issue of a management structure that will lead to that integration. A prime need for research in the MIS field is to address authority and accountability and to help relieve the

strains on an organizational process designed 20 years ago with no expectation that information technology would really matter for the fundamental activities of the business.

Traditional DP must accept a subordinate role. It is one aspect of a meaningful management career path in a broad field. The computing resource has many facets. There will be many career trajectories. DSS is one entry level; it starts toward the marketing side. Many people will still choose to start on the manufacturing side in DP.

DP must also recognize that the DSS intrusion was necessary. When the DSS movement began to build momentum, the main opposition to the very idea of DSS came largely from DP. Only four years ago, if one talked about DSS at a conference of DP managers, the response was disdain or abuse. It is important now to stop the fight. Nothing will be gained in the DSS field by trying anymore to highlight the separation from DP, but much can be gained by trying to blur it.

DSS managers may be the next leaders of DP. Too many old-line DP professionals are temperamentally and intellectually unlikely to accommodate to what is happening around them.

To sum up the contribution of DP to DSS is to provide the necessary infrastructure for leveraging DSS from a small-scale concept to a large-scale one. DP provides the strategic technical base and, in the end, it can provide the organizational base. DSS will have organizational influence via executive support systems, but the organizational strength needed to evolve DSS will rest on information resource management's being embodied in high accountability and high authority.

It may be that many DSS managers will be the next leaders of DP. It has become fairly obvious that too many old-line DP professionals are temperamentally and intellectually unlikely to accommodate to what is happening around them. The DSS builder who has worked with complex systems that go beyond dataless models is qualified on both counts to help move DP forward.

DSS people usually understand the business better than DP. One cannot be an isolated DSS designer 20 miles away from the client and take some functional specifications and come back in six months. It is unfortunate that in the 1960s many companies decided one of the safest places to put their money was in buildings. One of the buildings they needed was a new data center. As a result, large numbers of DP organizations have never seen their users because they are 25 traffic jams and 15 miles away. DSS is more embedded in the ongoing activities of the organization. That is why every DP manager really would benefit from an immediate infusion of such people who simply know how the organization works.

DSS people also know the new development technologies. The tools DP is relying on to solve the software productivity bottleneck are the ones DSS grew up with. Any scenario for successful exploitation of information technology over the next five years or more assumes end-user development. We will push applications further into the organizational culture and will rely on highly flexible systems that evolve over time. DSS builders will be key in helping reeducate many programmers and analysts about the craft of information systems development.

The tools DP grew up with — clumsy software languages like Fortran and Cobol — were inadequate in their inception. DP professionals have relied on the notion that systems will always be built from the center out to the users by a technical manufacturing arm now out of date. There are many reasons for infusing the DSS philosophy, even at the bottom level of the organization, to make it easier for DP to fulfill its traditional role. OA

Keen is chairman of Micro Mainframe, Inc. in Cambridge, Mass. He is the conference chairman of the conference, "Microcomputers: High Performance/High Payoff," sponsored by Micro Mainframe and scheduled for March 1 in New York. He is also speaking at the conference, "Software Tools for Distributed Decision Support Systems," Feb. 27-28 in Boston, sponsored by Suffolk University.

PHOTOS © 1984 GWENDOLYN STEWART

JOHN NAISBITT LOOKS AT THE WORLD OF QA

John Naisbitt gained international recognition with his megahit, *Megatrends: Ten New Directions Transforming Our Lives*, which has been at or near the top of the bestseller list for over a year. Naisbitt's staff did more than 12 years of content analysis on 6,000 local newspapers, and the book is a result of that research. This thorough examination of the major news trends around the country led to Naisbitt's identification of "critical restructurings" of our lives. Among his megatrends:

• Although we continue to think we live in an industrial society, we have in fact changed to an economy based on the creation

and distribution of information.

• We are moving in the dual directions of high tech/high touch, matching each new technology with a compensatory human response.

• We are giving up our dependence on hierarchical structures in favor of informal networks. This will be especially important to the business community.

Naisbitt, who also publishes the quarterly *Trend Report*, has served as senior vice-president of the research firm of Yankelovich, Skelly and White and as chairman of the board of the Center for Policy Process in Washington, D.C. He was a special assistant to President Lyndon Johnson and served as special assistant when John W. Gardner was secretary of health, education and welfare.

Glenn Rifkin, *ComputerWorld OA*'s senior writer, met with Naisbitt in his Washington office to discuss the impact these megatrends will have on office automation.

In *Megatrends* you said, "We're living in a time of parentheses, a time in between." How does the office of the future relate to that?

We're on the edge of rethinking the social institution we call the

corporation. We're going to rethink social contracts, arrangements between people, responsibilities and so on. And we're just beginning that process. The rethinking will influence the technology and vice versa.

Do you see the computer as a liberating rather than a constricting or monitoring device?

On balance, technology is going to liberate rather than harness the worker. What's happened for generations is that in companies with 1,000 workers, people have been treated pretty much the same because that's how you keep track of them. With the computer to keep track, you can have a unique arrangement with each of 200 or 200,000 employees. We have to see the computer as a tool that manages complexity.

Assuming that it will harness the worker is to expect the new technology to do things we did in the old structure of the company. The new structure is going to be very different from that.

If I had to describe that new structure today — and I'm a bit hesitant because it's just unfolding — I'd say we're going to be very decentralized in responsibilities and the way those responsibilities are executed. Anyone who thinks he's going to be competitive using the old structure and the old ways of monitoring employees is mistaken. What's liberating and where you get incredible productivity is when you give people more control over their own lives.

"The computer can help us by threading through and selecting what we need for one task or another. The task of the age is to convert that incredible amount of data we're drowning in into knowledge, into intelligence."

Can that work?

One of the best-kept secrets in America is that people are really dying to make a commitment, but they're not given the space and the freedom to make it. In Japan, one thing that really impressed me was that the employees I dealt with everywhere acted as if they had taken personal responsibility for the success of the company. When you have a company full of people who take personal responsibility for it, you've got a dynamite company.

You said in *Megatrends* that "we are drowning in information, but starved for knowledge and intelligence." Could you explain that statement?

The information din is incredibly high. It's gone from supply, which we have an overabundance of, to selection. That's how the computer can help us, by threading through and selecting what we need for one task or another. The task of the age is to convert that incredible amount of data we're drowning in into knowledge, into intelligence.

You discuss the information float. With the new technologies, can the information float be conquered or controlled?

What we're doing is foreshortening the float. We're sending information around at the speed of light. If I send a letter to you, it takes four days to get there and a week to answer. Then it takes a few days to get your answer back to me. In a couple of weeks, we've negotiated some transaction.

If I send it to you electronically and in that context you respond within a couple of hours and get your answer back to me instantaneously, we have negotiated the same transaction in a couple of hours rather than a couple of weeks. That's what collapsing the information float is all about. But it must be done with strategic vision. Strategic planning is worthless unless you have strategic vision.

Do you have some sense that what is being done — this rush to hook up the office electronically — is being done without strategic vision?

In many regards it's being done for its own sake — because it's the thing to do. In some cases, we're accelerating the rate at which we send dumb messages ricocheting around. We're getting more and more efficient at sending dumb messages and dumb ideas among installations or institutions.

We've got to be more thoughtful about what it is we're accelerating. That's why I say all this strategic planning or accelerated messaging is worthless unless we have a good sense of what it's contributing to and where it's taking us.

You wrote that we're now in the second stage of innovation — improving on old technologies — and that the third stage is new uses and discoveries for the technologies. Wouldn't the office seem to fit better in the third stage?

We're very much in the second stage of the office. We're sort of sticking the technology onto the office, but notice that we're not doing anything any differently. Essentially, an office is a telephone, an in-basket, an out-basket and a waste basket. We're just doing those things more efficiently.

In the third stage are the things that grow out of the invention itself — things suggested by the computer itself. And we're not even on the edge of that yet. We're still very much in the second stage and will be for a long, long time.

Do you have some view of what the office of the future will evolve to be?

The office of the future will be very decentralized. Part of that process is a change in what a manager or leader does — a move from order-giver to facilitator. I think the really successful manager of the '80s and '90s will be the manager who creates a really nourishing environment for personal growth.

In an environment where you're experiencing personal growth, it might not be conducive to have a bunch of little cubbyholes. I think it will be a much more open, decentralized place. Those considerations, in the short term, are probably more important than making everything electronic.

Making everything electronic is not the important thing — it just makes us more efficient at what we're doing. What really is important is to notice what we're doing and to decide whether we're losing ground by becoming more efficient.

It's like productivity. Had Chrysler, a few years ago, used the same workers to produce twice the number of big dinosaur cars, would that have been productivity growth? The meaning of these words really turns on what we're doing. What is the end we are working toward when we attempt all this efficiency?

Do you see any answer to that?

Yes. An institution has to develop a shared strategic vision of where it is going. The Koran says, "If you don't know where you are going, any path will take you there." Most companies don't know where they're going, especially in this time of very basic change.

They do things because they seem like a good idea or are momentum-driven or whatever. But to what end? There are a lot of people who don't know what business they're in. And whatever business they were in, they're not to it anymore and they often don't even know it.

There are certainly examples of that among the computer vendors.

That's right. The U.S. is not in a recovery, and we have not been in a recession. What we're in is much more profound than that. We're changing economies. We haven't changed economies in 150 years.

Now we're going through a long shakeout period. It's been going on for about three decades now, with companies shrinking, companies merging and companies going out of business. The important thing to the new economy is that during the long shakeout period, thousands of companies will go under — thousands of computer companies and thousands of software companies. That's the good news, because we're creating a whole new economy just the way we did when we left the agricultural economy and moved into the industrial economy. And we have a similar incredible entrepreneurial explosion.

The character and the nature of this new electronics information economy is such that we will end up with thousands of companies, but to get there, we will go through thousands and thousands of other companies.

Do you think the electronic office environment will be affected by the concept of high tech/high touch that you mention in the book?

With more and more technology, we're softening the environment to create a balance, and that's beginning to happen in our offices. Our offices are going to have a softer, more compensatory kind of look. At the same time, those environments will have to be more and more conducive to personal growth.

Is there much that can be done in an office setting that is like a rabbit warren?

No, and that's why we have to change that image. Those organizations that change that first, understand that first and deal with that first will be way ahead of

competitors that don't. Because those changes will contribute to people's willingness to make a commitment instead of just putting in their time.

You also said that in an information economy, rigid hierarchical structures slow down the information flow just when greater speed and flexibility are needed. Do you see OA as a means to change that?

The computer is going to smash the pyramid. Hundreds of years ago, we created this hierarchical managerial pyramid. It served us extremely well, but it has also been incredibly antiproductive. We needed it to keep track of people and things they did. But that was mostly just handing information up and handing it back down.

When we reconstitute our organizations along much more horizontal lines — smaller and smaller units, more entrepreneurial units and more participatory units — what occurs is an incredible whittling away of middle management. You really squash the pyramid.

You wrote, "Teleconferencing is so rational, it will never succeed." Would you comment on that?

People say they're going to do teleconferencing to save all this money on traveling and expenses. Teleconferencing works only when it's not important. It works only for one-way communication; we're moving to a period where one-way, top-down communication doesn't work at all. Because if it's of any importance at all, then people have to get together. There's no end to meetings; people really have a need to get together.

That's why I said the electronic cottage is not going to go very far. Very few of us are willing to stay at home and tap out messages. Most people want to go to the office. Most people want to be with people. And the more technology you put into a society, the more people want to be with people.

Alvin Toffler seems to think that, although not everyone will work at home, it is more of a possibility than you give it credit for.

I think it's great for emergencies . . . like Mondays. It's terrific for some things. It's another option. But it won't be for everyone.

We'll increasingly have satellite offices. You will be able to go to the office, but it will be in the same suburb where you live. That satellite can be connected to all the other offices because we have the technology to do that.

The office worker has expressed concern over issues like job displacement and job deskilling, as well as health hazards. What trends do you see developing regarding these allegations?

I don't know very much about it. Some studies say the use of computer terminals is not injurious to health. I myself don't need any studies to tell me it can be incredibly boring. But it's important to remember that the computer terminals we have today are not the computer terminals we will have tomorrow. In people's minds, when they think about 10 years from now, the image continues to be the CRT screen and the keyboard, as if that is the state of the art and it will never change.

That is absurd. It is going to be much more like Ms. Pac Man. It's so primitive now. We're about at the stage where we were when we had steam-driven automobiles. I think those computer stations will be quite different from those we now have.

You mentioned quality circles, which have flourished in Japan. Are they an option for office workers in this country?

It's a very viable option in this country, but it's also a manifestation of something larger. It's a manifestation of people who are more involved in their work and more responsible for what they are doing. It has to do with the idea of participatory democracy, in which people whose lives are affected by a decision are part of the process of arriving at that decision.

It used to be that decisions would be made by someone on the 26th floor who would send the word down and everyone would salute it. It just doesn't work anymore. People are saying, "If my life is involved with something, I've got to be part of the process of arriving at those judgments." That's how to run a company, too.

Quality circles are just a manifestation of that idea of participatory democracy; the people most involved in what's being done are the ones who decide how to do it best. It's very straightforward.

Can an OA system expedite that participation or will it hinder it?

Let's stop on the term "OA system." Often a company will spend $40 million on a new computerized system, but not a penny on the "high-touch" or human side. The installations that work really well are those in which the people who work on the system — who run the system — are part of the process of deciding which system to bring in. Not only are their lives affected, but also they know more about what that system has to do than anyone else. It just makes wonderfully good sense to get people involved.

You pointed out that there possibly won't be enough managers with enough high-tech knowledge to install the systems along with the kind of worker participation you spoke of.

It's the opposite of that. I said that the new manager is not someone who has all the answers. It's someone who knows how to create a process to get the answers. There's no stigma attached to not having the answer. The necessary quality is a willingness to trust people and to utilize human resources.

The real competitive edge, as we move into this new economy, will be our human resources. Those of us who get the most out of our human resources are going to have the competitive edge. This is in a different sense from the old productivity ethic, where you get the people to turn out one more widget.

The goal here is getting more and more creativity and commitment out of people. OA

"IDMS/R represents a major advance in database technology."

Dave Litwack*

David Litwack is Cullinet's Vice President of Product Development. Mr. Litwack has contributed significantly to the many technical advances Cullinet has achieved in database software products, including IDMS/R. Mr. Litwack joined Cullinet in 1976. He is a Cum Laude graduate of Brandeis University and holds a Masters in Computer Science from Boston University.

Because IDMS/R is the first relational DBMS designed for both the DP professional and the end user.

IDMS/R is not only a relational database management system, but a particularly powerful one. IDMS was made relational by removing all pointers and allowing the user to define data as tables and providing the traditional relational operators such as selects, projects and joins. The major benefit of a relational DBMS is the capacity to develop applications faster because the developer does not have to be concerned with the database design. IDMS/R provides this and much more.

For example, the Automatic System Facility (ASF) of IDMS/R is a major advance over fourth generation languages. The ASF is so comprehensive and easy to use that all a user need do, to develop an application, is define a relational record. The Automatic System Facility dynamically generates all necessary supporting structures including data definitions, screen formats, application processing logic, and documentation. So, the developer can witness the application being produced, literally, in seconds. This capability makes IDMS/R the perfect system for the end user.

Data processing professionals can use the ASF to help develop production applications. The ASF can be used to build a prototype that can be enhanced, using Cullinet's fourth generation language, ADS/OnLine, into a complex production application. But, when they build a complex high volume application using IDMS/R, DP professionals require outstanding performance. Typically, 5% of the data relationships (joins) in any application are accessed 95% of the time. With IDMS/R, they can simply change these relationships to predefined joins and benefit from a dramatic boost in performance. We call it Relational Fastpath. Relational Fastpath makes IDMS/R a unique DBMS and a perfect system for DP professional's system development needs.

In addition, IDMS/R has the most sophisticated back-up and recovery capability of any DBMS, full integration with personal computers and is also integrated with Cullinet's complete line of financial and manufacturing applications.

In summary, IDMS/R was designed to satisfy the requirements of those who want to develop applications faster and those who have the responsibility of processing them.

For further information, attend a Cullinet Seminar. Mail the attached coupon or call the Cullinet Seminar Center at 1-800-225-9930 (in Massachusetts, 617-329-7700).

IDMS/R Seminar cities and dates

City & State	Date	City & State	Date	City & State	Date
Albany, NY	Mar 15	Greenville, SC	Mar 6	Orange County, CA	Mar 6
Allentown, PA	Mar 1	Indianapolis, IN	Feb 21	Oshkosh, WI	Feb 28
Atlanta, GA	Mar 28	Indianapolis, IN	Mar 27	Ottawa, ON	Feb 21
Arlington Hts., IL	Feb 23	Jackson, MS	Mar 15	Pittsburgh, PA	Feb 29
Augusta, GA	Mar 14	Kansas City, MO	Feb 23	Portland, ME	Feb 21
Baltimore, MD	Feb 21	Knoxville, TN	Mar 28	Portland, OR	Mar 15
Bloomington, IL	Feb 21	Louisville, KY	Mar 30	Providence, RI	Mar 22
Boston, MA	Mar 6	Little Rock, AR	Mar 15	Quincy, IL	Feb 29
Boston/ Westwood, MA	Feb 23	Los Angeles, CA	Mar 27	Raleigh, NC	Mar 20
Bowling Green, KY	Feb 1	Madison, WI	Mar 15	Rochester, NY	Mar 29
Bridgeport/ New Haven, CT	Mar 6	Meadowlands, NJ	Mar 7	Sacramento, CA	Feb 21
Charleston, WV	Feb 29	Memphis, TN	Feb 23	Salt Lake City, UT	Feb 21
Charlotte, NC	Feb 23	Merrimack, NH	Mar 29	San Antonio, TX	Mar 15
Chicago/ Rosemont, IL	Mar 20	Milwaukee, WI	Mar 7	San Diego, CA	Feb 22
Cincinnati, OH	Mar 21	Minneapolis, MN	Mar 28	San Jose, CA	Feb 14
Cleveland, OH	Mar 28	Montral, PQ (French)	Mar 14	Springfield, IL	Mar 6
Columbus, GA	Feb 28	Montreal, PQ (English)	Mar 21	Springfield, MO	Mar 29
Columbus, OH	Mar 6	New Orleans, LA	Feb 29	Spokane, WA	Mar 28
Davenport, IA	Mar 13	New York, NY	Feb 22	Tallahassee, FL	Mar 1
Detroit, MI	Mar 14	New York, NY	Mar 20	Toledo, OH	Feb 24
Ft. Lauderdale, FL	Mar 22	New York/ Long Island, NY	Mar 27	Toronto, ON	Mar 20
Ft. Wayne, IN	Mar 6	New York/Rye, NY	Mar 15	Tucson, AZ	Mar 20
Ft. Worth, TX	Mar 15	Oakland, CA	Mar 13	Vancouver, BC	Mar 14
Grand Rapids, MI	Mar 27	Omaha, NE	Mar 1	Washington, DC	Mar 6
				Wichita, KS	Mar 6
				Wilmington, DE	Mar 27
				Winnipeg, MB	Mar 6

Visit us at Softcon, Feb 21–23, Booth #A1500.

I'd like to attend your seminar on _____ (date) in _____ (city)

Computer _____

Name/Title _____

Name/Title _____

Company/Department _____

Address _____

City _____ State _____ Zip _____

Phone ( ) _____

Mail to: The Cullinet Seminar Center, 400 Blue Hill Drive, Westwood, MA 02090-2198

Cullinet Software products are designed to run on IBM 360/370, 30XX or 43XX or plug-compatible computer systems. 2/16/OA

Database: Cullinet

ALAN WITSCHONKE

IBM FLEXES ITS OFFICE MUSCLE

By Glenn Rifkin

Despite its massive presence in the office, IBM has only recently begun to get its act together in office automation. Even with its Personal Computers, Selectrics, Displaywriters, 3270 terminals and so on, the Big Blue machine has yet to offer a cohesive OA strategy and OA system to its customers.

Whatever the reasons have been for this apparent faux pas, as 1984 unfolds, it will become increasingly apparent that IBM intends to correct the omission. And as the computing universe well knows, when IBM decides to attack, it's time to head for the shelters.

In late 1983, IBM went on the offensive and made it known that it was pulling out all stops to establish control of this explosive market. At a New York OA conference in November, IBM's J.T. Boyle, director of quality and general development in the Communications Products Division, summarized IBM's strategy in the office: "We will provide optimized solutions for the diverse environments and — with architectures and network functions — will integrate those solutions into a single system for all users."

In its office arsenal, IBM has a varied and growing array of weapons. Though industry analysts offer praise for some products and scorn for others, all agree IBM is a formidable figure in the OA market — if for no other reason than it is IBM. Boyle pointed out that by 1989, expenditures on office systems are expected to be $70 billion and IBM will "actively pursue that business." As one consultant put it, "IBM intends to dominate any market it enters."

Although it undoubtedly will get what it wants in the long run, IBM must face a stiff challenge in the office arena. Aside from such staunch competitors as Wang Laboratories, Inc., Data General Corp., Digital Equipment Corp. and Hewlett-Packard Co., IBM's sternest test will come from the recently unleashed AT&T, which has made clear its intent to garner a major share of the office market.

Analysts nevertheless tend to agree that AT&T's challenge is still on the horizon. For IBM, the current mandate is to answer the many internal questions it faces in the office. For example: Does Big Blue have a workable OA strategy? If so, can that strategy incorporate its varied and often incompatible product line into a useful and reasonably priced integrated office system? Are end users now sophisticated enough to look beyond IBM's reputation and ask for more than IBM can currently provide? What will IBM do to solve the communications needs for the office?

Even without an integrated office strategy or a single system offering, IBM had an enviable year in the office in 1983. The phenomenal sales of its PC continued (they owned an estimated 28% of the market) and among the PC, the Displaywriter and earlier word processors, IBM had an installed base of more than half a million desktop workstations, according to International Data Corp., (IDC) a Framingham, Mass.,consulting firm.

Sales of stand-alone products, however impressive, don't answer the OA questions, however. One of IBM's first responses to these questions was the creation of the Entry Systems Division within the Information Systems Group at IBM. The new division, established in August, has responsibility for all low-cost high-volume office workstations.

According to Bob King, director of IBM's Information Systems Group, "It just makes sense to put as much as we can in a common management and common development system." King added that IBM has also expanded its marketing and distribution operations to utilize new and varied channels such as mail order, retail stores, and value-added resellers and dealers.

With the new division in place, IBM began its attempt at a smooth integration of its own diverse product line. Last fall, the company delivered the first in a salvo of major announcements which it believed fulfilled its June 1980 statement of direction of providing full interchange and access capability for office products.

The announcements included the following:

- Systems Network Architecture (SNA)'s newest feature: distribution services. Snads reportedly contains the mechanics for transferring information from one system to another.
- Enhancements to IBM's Distributed Office Support System (Disoss). The new release, when coupled with Snads, reportedly will provide multihost document distribution.
- Enhancements to the 8100/Distributed Office Support Facility (Dosf), to the 5520 Administrative System programming, and to IBM's Professional Office System (Profs). Among the enhancements is the ability of the 8100/Dosf to exchange revisable documents with Displaywriter and 5520 systems. The intent to provide document exchange between Profs and Disoss was also announced.
- Disoss Professional Support Services (Disoss PS), which reportedly provides professional support applications to 3270 terminal users on MVS and VSE systems.

In addition, IBM stepped up support of its Document Interchange Architecture and Document Content Architecture (DIA-DCA), which reportedly will permit the transfer of documents between dissimilar (and even non-IBM) devices. King acknowledged that IBM is extremely interested in standardizing DIA-DCA in the marketplace.

The announcements flowed on. The unveiling of the XT/370 PC and the 3270 PC, along with clear indications that both a local-area network and a Unix-like product were on the way, continued to rock the office world. As 1983 drew to a close, shaken competitors and over-zealous analysts wondered whether there would be any office market left when the blue dust finally settled.

Despite the barrage, however, not everyone was convinced that IBM's dominance of the office market was a fait accompli. As all vendors know

(and users are quickly learning), the bridge between announcement and delivery is a wide one: even IBM can run into trouble traversing it. Although consultants agree the proposed solutions look good on paper, they are adopting a "wait and see" attitude for many of the announcements.

In fact, according to IDC analyst Tom Elliott, IBM's multiple workstation offerings may be more of a burden than a blessing. "As users discover they have real business requirements for interdesk electronic communications, they also discover there is still a long way to go before the diverse range of IBM devices is capable of genuinely unrestricted communications," Elliott stated. "Furthermore, user interfaces differ from machine to machine, so a person cannot necessarily sit down at any workstation and use familiar commands.

"IBM has gone too far along too many different paths to offer a uniform and relatively consistent set of office products," he added.

Christine Hughes, vice-president of the office information systems program for the Gartner Group in Norwalk, Conn., said although the enhancement to Disoss (Version 3.2) might help solve the distribution capabilities, it won't be available until October and will be quite costly.

Even more critical is the analysis offered by Tom Billadeau, president of the Office System Consulting Group, Inc. in Cambridge, Mass. He said the confusion over IBM's office strategy is because "they simply don't have one." Outside of the PC, Billadeau stated, IBM's office products are unimpressive: "If you tie together mediocre products, all you get is a mediocre system."

Such systems as the 8100/Dosf or the 5520 are cumbersome and confusing and, according to Billadeau, the reason Profs is not more successful is that people aren't willing to buy a mainframe with the VM operating system just to run Profs. Billadeau said he believes the Displaywriter is outmoded and overpriced and IBM may well stop manufacturing the product in the first quarter of this year. "They may have enough inventory to keep selling it for two years, but I suspect we will see a new Displaywriter based on the PC chip." He noted that when price cuts on a product are announced — as they recently were for the Displaywriter — it is often a signal that IBM intends to phase out that product.

Calling the 5520, IBM's Administrative System, "a real dog," Billadeau offered the opinion that the system was not ergonomically designed and had very poor word processing. The 8100, he added, has not sold well for OA purposes and its strength is in computer-assisted mailing tasks. "It was not really meant to be a desktop solution."

IBM's anticipated local-area network, reportedly a token-passing baseband product, was scheduled for announcement in early 1984, but according to analyst Hughes, it has been delayed for six to nine months. Hughes said that IBM is rumored to be working with both Sytek, Inc. and Ungermann-Baaa, Inc. to develop an Ethernet-like local-area network as an interim solution.

Although IBM traditionally remains mum on its plans, King acknowledged that some changes are in the wind. While calling the Displaywriter "a damn good product," he admitted a new version was in the works. He also said IBM is well aware of the PC's potential to undercut sales of the Displaywriter. "I'm not sure a general-purpose word processing package can ever replace a package tailored for a specific task. But nothing prohibits people from putting a super good printer and Wordstar on a PC and using that to displace the Displaywriter." The 8100 will continue "to play a role because the notion of distributed data processing is still very much with us." King said and added that IBM is very interested in improving its hardware and communications in every area. "The technology moves so fast that whether or not we've got our hands full, we've got to move on or we'll get hopelessly outdated."

King admitted IBM has lagged behind in offering its customers an integrated office solution. He would only speculate as to the cause of that dilemma, stating that "it's been very, very difficult to detect any huge, significant trends that leaped out and said 'that's what we'll base our plans on.'"

The introduction and success of the PC helped clarify the situation to IBM because it made possible tremendous price performance improvement. King denied that the shackles of the 13-year federal antitrust suit played a part in the problem. "I think we were just trying to figure out what was going on like many other people."

Because IBM's current offerings are so diverse and new products are still in development, the company's software offerings and open architectures are crucial to tying the workstations together. Though Disoss offers a solution, it is not simple or cheap to implement. It is more likely, consultants agreed, that DIA-DCA will offer a preferable, more elegant solution to the problem.

"The strategic importance of DCA and DIA cannot be overrated," IDC's Elliott stated. "Regardless of whether or not IBM gets into the local-area network market in a major way or develops and markets a voice/data PBX, the transmission medium is secondary to a set of architectural specifications that will allow dissimilar devices to interchange editable documents.

"By publishing its DCA and DIA specifications as it has done with SNA, IBM is once again opening up the IBM world — but on IBM's terms. This is a recognition that even IBM cannot be all things to all offices, and in order to preserve its market leadership it must make its information networks available to suppliers of specialized products," Elliott said.

"By publishing its DCA and DIA specifications as it has done with SNA, IBM is once again opening up the IBM world — but on IBM's terms. This is a recognition that even IBM cannot be all things to all offices."

Hughes pointed out that DIA-DCA has the potential to become the de facto standard in the office, giving IBM a chance to overcome the challenge of a Wang or DEC, both of whom integrated their office products as they were developed.

For IBM, the Scanmaster I image processor was the first product to be developed with the DIA-DCA protocols in mind. It was designed, Elliott pointed out, with multiple data types in mind and for communications within a Disoss network containing different terminal types. Elliott regards it as clear evidence that IBM is planning its newer products in that direction.

IBM also sparked wide interest when it purchased significant blocks of both Rolm Corp. and Intel, Inc., an indication that it will look outside its own environs for needed office technologies. King stated that IBM will leave the building of a PBX to others. Consultants view that as proof positive that Rolm will produce an IBM-endorsed PBX.

IBM has also been forced to look outside for another essential office offering: the Unix operating system. Ironically, Unix was developed by its fiercest rival, AT&T. King acknowledged Unix as a "valid requirement" for its OA push, and IBM last month announced its own version of Unix for the IBM PC. The system, called Personal Computer Interactive Executive (PC/IX), was developed for IBM by Interactive Systems Corp. and will run on both the PC and the PC XT. It will be available in April.

Also available in early 1984 will be the enhanced IBM PCs: the 3270 PC and the XT/370, both of which sent shock waves through the industry when announced. Addressing the micro-to-mainframe link question, both the XT/370 and the 3270 PC have been designated as key office products.

The 3270 with its windowing capabilities offers vast potential for users doing multiple-task-type work. According to Boyle, the combination of document distribution, library services and professional applications found in both Disoss and Profs, together with the PC and 3270 applications give IBM "an offering I believe is unmatched in our industry."

Ironically, though analysts are high on the XT/370's potential as an OA offering, King is not convinced the XT/370 is crucial as an office tool. "The XT/370 will be useful to VM users, but I don't know how many will download Cobol H and run a compiler at the local level. There is a class of users that will find it very useful, but I'm not sure they are general-purpose office employees."

"I really like the XT/370," Billadeau said, "but from an OA perspective, there is little to access from the host level that would be useful for OA applications. It's more of a development tool."

IBM will not designate any single product as its most significant OA offering. "I don't think there is one. For every guy who says the XT/370 is the best thing he ever saw, there is a 3270 advocate who says 'you're nuts.' I don't think the office is a monolithic thing," King said.

As IBM gears up this year, the industry will soon learn whether it will become the monolithic vendor in OA. IBM has traditionally sold to DP managers, and a lot of MIS people "owe their careers to IBM," Billadeau said. That, however, doesn't hold true in the office, where IBM created very few careers, he added.

"You don't hear commitments to IBM in the office as you do in other areas," Billadeau explained. "When you hear about those $40 million OA contracts with E.F. Hutton or the U.S. Forestry Service, you hear about Data General or Wang or Digital. For a systems solution, people aren't looking to IBM."

At IBM, the perception is of very heavy competition from domestic and Japanese vendors. Though acknowledging AT&T as a formidable opponent, IBM denies any specific plan of action to face the communications giant. King said IBM will continue to follow its current course of introducing new products and open architectures.

"I don't know of one of our products that doesn't have heavy competition from one place or another. We are aligning ourselves to be the low-cost producer of information systems and to be competitive, effective and responsive. We're doing it because we perceive it is and will continue to be very, very competitive out there," King stated. OA

Rifkin is Computerworld OA*'s senior writer.*

Supermini Moves Into the Office

By Charles W. Newton

Superminicomputers are increasingly being used for office automation applications. This is especially true when large numbers of terminals or workstations are required, either centrally or in dispersed locations, whether working individually or in clusters.

An informal telephone survey of data processing and management information systems (MIS) executives from 16 U.S. superminicomputer sites illustrates this trend. Eight of these sites reported supermini-based OA applications either in use or on the drawing board.

The vice-president of information systems at one large Wang Laboratories, Inc. VS installation indicated that the organization's supermini is being put to work in two main office-related functions: the preparation of correspondence and the development of an evaluation and planning system. At Dunkin' Donuts, another Wang VS site, R. Thomas Burger, vice-president of information services, indicated extensive use of that system for word processing, including point-to-point document trans-

GREG WENZEL

mission. A federal government agency MIS officer said his agency used its Harris Corp. H-500 supermini as "... an MIS tool for data base management and electronic mail."

The MIS director of one of Prime Computer, Inc.'s largest multisystem installations cited text preparation as a primary application. At another Prime site, Suffolk University, Paul Ladd, director of MIS, said the university's Prime supermini is used for WP and electronic mail applications. Suffolk also provides financial planning applications and is discussing plans for developing an office-oriented spreadsheet graphics capability.

In yet another example, the DP director at a large consulting services organization in the Northeast said its organization used its Digital Equipment Corp. VAX 11/780 in WP and in office-oriented customer support applications.

Seven of the eight organizations that indicated use of superminis for OA applications provided direct support to end users via on-line terminals.

The 32-bit processor segment of the overall OA systems equipment market will continue to grow in terms of total dollar volume. In 1982, U.S. manufacturers shipped an estimated 7,150 32-bit superminicomputers above board level. These units represent a total installed systems value of about $700 million.

Approximately $200 million of that amount has been applied directly to the procurement of superminicomputers for use in commercial office environments. Although these systems are not all performing what we have come to call OA functions, they are nevertheless widely utilized as multifunctional processors. As a result, OA functions are indeed being transferred to these systems (see Figure 1).

In the last three years, the growth rate of superminicomputer shipments has outpaced rates for several other segments of the computer industry. Figure 2 lists the total information processing revenue growth for all superminicomputer manufacturers.

The trend for superminicomputers to move into the office appears warranted for the large office environment because of two architectural design capabilities. First, the strong communications capabilities of these machines allow extensive workstation support. Second, the very fast internal bus structures offers support for graphics — a need in high-tech segments as well as in the office.

Other conditions that point up the supermini's potential in the office environment include favorable price/performance characteristics; increasingly powerful systems are available for lower prices. In addition, the large array of program languages and applications software available to end-user departments means that commercial users are less self-reliant than their high-tech counterparts; as a result, applications software availability is vital.

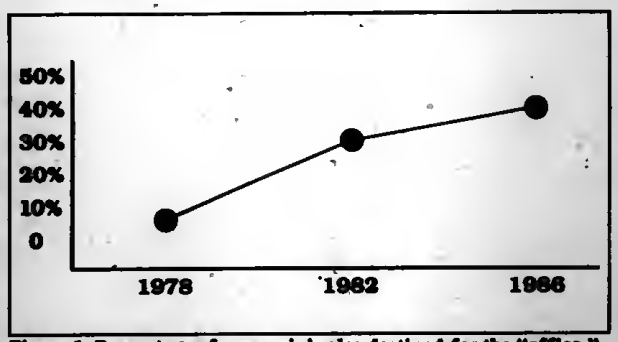


Figure 1. Percentage of supermini sales destined for the "office."

Superminis are typically designed for multiple concurrent users performing multiple activities and doing so interactively or on-line. Superminis, like their smaller mini counterparts, can successfully be installed outside the computer-room environment.

Completely incompatible superminis will be relegated to a specialized dedicated applications environment where the system is independent from the organization's other internal computing resources. Almost every superminicomputer supplier even thinking about participating in the commercial and office markets has already developed at least one IBM-compatible protocol as well as an X.25 interface.

The availability of cost-effective superminicomputers has en-

Rank by IP Revenue 1982	1981	Company	Total Revenue 1982	Total Revenue 1981	Net Income 1982	Net Income 1981	IP Revenue 1982	IP Revenue 1981	IP Growth% 81-82	IP Growth% 80-81
1	1	Digital Equipment	3,881	3,199	417	343	3,881	3,199	21	26
2	2	Hewlett-Packard	4,264	3,579	268	206	2,198	1,771	22	17
3	3	Wang Laboratories	1,199	866	107	78	1,199	866	38	66
4	4	Data General	806	737	25	61	806	737	9	13
5	5	Prime Computer	436	386	45	38	436	386	16	38
6	6	Harris	1,719	1,583	78	104	336	300	8	30
7	8	Tandem	313	208	30	27	313	208	30	91
8	7	Perkin-Elmer	1,087	1,116	66	88	211	226	(6)	7
9	9	Gould-Sel	1,571	1,599	66	104	184	141	30	98
10	10	General Automation	99	136	(4)	0.1	99	126	(21)	(1)
11	11	Modcomp	93	87	2	1	66	67	7	7
12	12	Floating Point	67	58	12	6	67	58	20	58
13	13	Computer Automation	66	78	2	2	66	78	(11)	(6)
		TOTALS	16,662	13,644	1,261	1,143.1	9,830	8,147	18.4	28.7
		% Change From '81 to '82	18.5%		9.8%		20.6%		Average	

Excerpted from Hare's "Corporate Strategies for the U.S. Computer Industry: 1981-1983 Edition."

Figure 2. Series 4 superminis, high-performance minis revenue growth and profitability ($ millions)

abled suppliers to appeal to a broad new market comprised of users with quite sophisticated computer requirements, but less than mainframe budgets. Price is one area in which the commercial market-oriented supermini suppliers have a comparative advantage over the new and relatively expensive IBM 4361 and IBM 4381.

From 1980 to 1983, the supermini became the vehicle by which a significant amount of DDP activity was accomplished. The use of superminis is becoming prevalent in dedicated, geographically dispersed applications in which data communications — local and remote — is a key element. In fact, it may well be that the superminicomputer, and not the microcomputer, will be responsible for the erosion of some hitherto untouchable remote computing services industry processing revenues.

The impact of the recently announced IBM 4361 and 4381 processors will place additional downward pressure on superminicomputer suppliers, at least on those with an eye to gaining a share of the commercial and office marketplace.

Although not directly compatible with VAX and other superminis, IBM's 4361 and 4381 are indeed competitive with superminis in several characteristics, including memory size, instructional set size, processing speed and workstation support. If we include the 4361 and the 4381 as superminis, we could safely predict that superminis will successfully continue their penetration into additional commercial and office markets. These new IBM processors will cause the growth rates of superminis used in nontechnical environments to abate over the coming year as IBM begins volume production of 4381s and 4381s.

The comparatively high price range of the new 4300 series products may place them at some disadvantage in direct competition with other than top-of-the-line superminicomputers from leading suppliers.

Four of the dozen or so companies manufacturing 32-bit processors specifically positioned as superminicomputers seem especially well-prepared to participate in the office environment. These four are DEC, Data General Corp., Prime and Wang.

Some of the other superminicomputer suppliers with products positioned at medium-tech markets may also eventually become interested in the office market. Hewlett-Packard Co. would be more likely to make such a move than would Gould, Inc. or Perkin-Elmer Corp., if we base our review on the traditional sources of strength for these suppliers.

The following is a closer look at the offerings of the four key suppliers positioning their supermini offerings in the office environment.

Digital Equipment Corp: The VAX family was extended into the commercial market, if not by virtue of the VAX-11/750, then certainly by the introduction of the VAX-11/730.

DEC's VAX line is an integral part of their entire OA strategy as well. The company's Office-Plus program, a mid-1980 interpretation of distributed data processing, allows personal computer users in an organization access to different data bases residing on VAX systems dispersed throughout the organization.

According to DEC, one factor inhibiting the growth of officewide or departmentwide computing was the need for small computers with large program capabilities. DEC has positioned the 11/730 as a product response to this market requirement.

Data General Corp.: DG has been an important participant in the superminicomputer marketplace since its introduction of the MV/8000 in 1980. DG's installed base (as of September 1983) of 32-bit Eclipse MV family was estimated at 1,200 units.

The Eclipse MV Series has been responsible in large part for increasing DG's presence in end-user markets. The downward extension of the Eclipse MV family in the form of the Eclipse MV/6000 and Eclipse MV/4000 has brought with it a greater level of interest in the commercial marketplace in using these 32-bit systems in commercial and office applications.

DG has stated that "The demand for 32-bit systems for administrative applications is growing rapidly and Data General has expanded and enhanced its 32-bit Eclipse MV family . . . to meet these growing needs." The company's newest 32-bit system, the Eclipse MV 4000, brings improved performance, larger memory price and cost advantages to customers. Its compact size and style are suited for office environments, according to its vendor.

DG's 1982 and 1983 advertising campaigns have used the Eclipse MV series' broad software program library to its advantage.

Prime Computer, Inc.: Prime has been the industry leader in applying 32-bit superminicomputers to the commercial and office environment since 1979.

The Prime 50 Series systems are used primarily in the business DP and computational processing markets in a wide variety of applications, including time sharing, scientific and engineering calculations, statistical analysis, computer-aided design, financial measurement and control, production and materials control, information retrieval, applications program development, OA and transaction processing.

The company has tended to picture itself as a distributed data processing market leader rather than a superminicomputer supplier. In fact, Prime has adopted a value-added, more meaningful and more directly associated set of descriptions for what it provides.

The 32-bit superminicomputer market has outpaced other industry market segments in recent years. The communications-oriented side of the industry has also done well.

Thus, to gain market advantages by providing superminibased distributed data processing (DDP) has been a strategically appropriate move. Prime, in 1979, was the first vendor to see the merit in marrying powerful minis, data communications know-how and DDP capabilities to meet the requirements of the commercial sectors of the market.

The company remained committed to DDP during 1982 and 1983 and is offering some of the industry's most complete mixed-vendor solutions to provide customers with strong gateways to the IBM world.

Prime made a special effort during 1983 to increase its presence in the office. By introducing its first line of internally developed terminal products, it is clearly on its way to establishing its name in the office environment generally and certain end-user environments specifically.

Wang Laboratories, Inc.: Wang is among the few computer industry companies that developed successful commercial market-oriented computer systems incorporating 32-bit superminicomputer technology at the high end of the range of processor offerings.

Wang's VS100 family of processors is the company's supermini entry. Positioned as the leader (or co-leader, along with IBM) in the OA market, Wang has become more competitive in its large OA systems configurations in those instances where it has proposed using the VS100 as the heart.

For large centralized OA applications, Wang has the capability in its VS100 Series to challenge Prime, DEC, DG and IBM. OA

Newton is president of Newton-Evans Research Co., Inc., Ellicott City, Md.

GETTING STARTED

Automating the office sounds like it should be, well, automatic. In reality, successfully implementing change is one of the most difficult stumbling blocks to office automation, as many organizations are finding out. This first Focus section of 1984 addresses many of the problems involved in OA implementation — hiring, training, vendor selection and change management.

1893. Architects discover up is better than out.

The proposition is easy enough to grasp. When space is at a premium, build skyward.

That's why Wright Line designed its PC WorkCenter to take up more vertical space and less horizontal. Let's face it, few offices embracing personal computers today were designed to accommodate an additional piece of substantial furniture.

Designed particularly for IBM Personal Computer Systems, our PC WorkCenter takes as little as 18″ × 24″ of floor space. Believe it or not, that's less space than your average office chair takes.

Our vertical ergonomic design provides for more efficient and convenient access to all computer components. The unit's storage capacity accommodates software manuals, diskettes and supplies, so every thing you need is all in one place. There's virtually no disruption to your normal work habitat.

As for security, just roll down the locking tambour door for overnight protection against theft and unauthorized use.

1984. IBM PC users discover up is better than out.

An internal cable management system protects against wire damage while leaving nothing underfoot. The master switch with circuit breaker allows you to activate the whole system with just the flick of a switch. And locking casters are ready to roll in seconds for shared use in other offices.

The PC WorkCenter is available in 50″ and 63″ heights, both well within acceptable height limits of contemporary office environments.

Wright Line has been supporting IBM for 50 years. First in the computer room, now throughout the office. And the way things are going, the sky's the limit.

For more information on our PC WorkCenter or for a complete catalog of PC support products, contact Wright Line, 160 Gold Star Blvd., Worcester, MA 01606.

Wright Line
A UNIT OF BARRY WRIGHT

HIRING THE RIGHT PEOPLE

By Glenn Rifkin

Before an organization can worry about the lightning-quick changes in office technology, it must confront the more pressing need of forming a competent OA team. As consultants, personnel agencies and information systems managers are discovering, that is akin to hunting for unicorns; the species simply doesn't exist.

The reason for the scarcity of polished OA professionals is simple. Office automation, although widely discussed, is a relatively new phenomenon and not enough time has yet elapsed for a large pool of OA specialists to develop. Large organizations in the forefront of automation often train people in-house to manage and staff their OA programs. After training and experience, those professionals become

hot properties with headhunters and rival organizations seeking skills that can be acquired only through hands-on experience.

Because the pool of talent is so small, OA managers have encountered endless frustration while attempting to hire from outside their corporations. In-house searches, often focused in the management information systems (MIS) or DP departments, have not produced much better results. Managers are finding that a DP background for an OA job is often a less-than-perfect match.

"Finding competent people to manage emerging functions such as office automation has been difficult and always will be," stated Tim O'Leary, manager of office systems field operations for ITT Corp. "We've been in a hiring mode, off and on, since February 1982, and it's extremely tough to find competent people."

John Hart, manager of office systems at Avon Products, Inc., agreed. "The resumes I'm getting are long but light, and there's not much broad experience out there. From the resume, they might seem top notch, but when you get them in and ask a few basic questions, you realize there's a lot of overselling going on."

Though each company has specific needs when it comes to office automation personnel, OA managers and consultants tend to agree on the perfect candidate. Technical background with a good working knowledge of a wide variety of office-related technologies is highly desirable.

But, the experts noted, a more important qualification is the ability to communicate and interact with the end user. Interpersonal as well as analytical skills are the keys to a successful career in OA management.

Although a few professionals do fit the description, many of these new-wave specialists have found more lucrative rewards in sales or consulting.

Karen Orton, president of National Training Systems, Inc. of Santa Monica, Calif., pointed out that since the technology is evolving so quickly, each organization will need very specific solutions to its OA needs. That will preclude any standard solutions in hiring. "There are no rules and no courses to take," she said. "It really takes a desire to learn while doing."

Of course, before a company can worry about an OA staff, it has to find a manager to organize and oversee that staff. Larger corporations, already heavily involved with OA, have solved the problem usually by looking within the MIS department for a senior-level person with an established relationship with top management. For organizations just getting started, the recommended approach is also to look in-house rather than outside. Some consultants believe that a strong manager is enough.

"If you can find the manager, you can solve the other problems," said Anne Mayfield, consultant for Arthur D. Little, Inc.

It is more practical to look within, the consultants said, not only because there are limited resources in the field, but also because a thorough knowledge of the business of the company is essential. David Dell, director of research services for the Diebold Group, Inc., said he does not see many efforts to recruit from outside. "You need good managers with credibility with top management. It would be unlikely to have some hotshot MBA with limited technical training come in and tell management to spend $30 million on office equipment."

The manager overseeing office automation does need greater business skills than technical

skills, according to Mayfield. The issues tend to be management, not technical. To sell the corporate brass on a system, the OA manager has to be capable of communicating bottom-line benefits, not just bits and bytes. Increasingly, the OA manager's resume shows a liberal arts, not a technical, background.

While agreeing that a strong leader is vital, Randy Goldfield, president of the Omni Group in New York, is wary of entrusting too much power to an individual. The danger is that if the company makes OA a one-man band, it will lose that person to another outfit. The field is "very hot," she said.

Frank Goldschmidt, placement manager with Robert Half Associates, a Boston placement agency in the computer field, agreed, saying that "1984 will be a very strong year for OA in my business." He pointed out, however, that the positions most requested will be analysts, staff consultants and trainers rather than managers. Managers are likely to be in place within the organization already.

There are exceptions. At the Bank of New England in Boston, Stephen Dale, vice-president of productivity services, said he found a manager from outside the organization who had the perfect combination of experience to run the office systems group. She had eight years in a mainframe environment, but also had excellent communication skills. In addition, her knowledge of the OA environment allows her to forecast two to three years down the road.

Of the nine staff members in Bank of New England's OA group, half were hired from outside the company; the others were moved from the bank's DP systems area. "Good leaders tend to clone themselves in the people they hire," Dale said. "But finding that good leader takes a lot of luck."

Though the logical spawning ground for potential OA staffers would seem to be the DP department — to which OA usually reports — there are many pitfalls to recruiting from that traditional mainframe bastion.

"MIS is an obvious source of talent," Goldfield said. "They have the technical expertise and know the systems, but their score with end users is very low."

The profile of a DP person is very different from an that of an OA staffer, according to O'Leary, who said that if there has been crossover from DP into OA, those people were probably "renegades."

"The office systems person has to say, 'How can we make the technology work for the user?' Users are much more computer-literate than before, and you can't give them the old mumbo-jumbo about a task's being too difficult. They are driving the applications, and they know the jargon and what they want. You can't get away with the traditional DP practice of telling people you are protecting them

"Users are much more computer-literate than before, and you can't give them the old mumbo-jumbo. You can't get away with the traditional DP practice of telling them you're protecting them from something. Now they know you're preventing them from access to their data."

from something. Now they know you are preventing them from access to their data," O'Leary said.

Although not all DP staff members will be able to make the transition, some viable candidates will be found within DP, according to Mayfield, from Arthur D. Little. She estimated that about 20% of the DP staff could be molded to fit the OA profile.

Outside DP, organizations have found considerable success within the word processing departments in the search for OA candidates. Because WP was, in many cases, a company's entry into OA, it is a natural progression for WP managers to move into the expanded technologies.

At Kaiser Aluminum and Chemical Corp. in Oakland, Calif., the WP supervisor became the office systems planning manager when centralized word processing was eliminated three years ago. According to David Geary, assistant director of corporate information systems, all four members of Kaiser's OA staff were members of the WP group. Each broadened his role by becoming a trainer of other technologies and by helping others. It wasn't, however, an easy transition.

"Because of their backgrounds, it has been difficult," Geary said. "There are problems in understanding data communications and also in getting the word out to the user community. There is no easy answer."

At ITT, O'Leary has seen several former WP specialists make the move into OA. He said, however, that because that skill represents only one aspect of OA, the WP background runs out of usefulness very quickly, especially when a senior-level person is needed.

Another natural resource, according to Mayfield, is from the secretarial ranks. Secretaries tend to understand the needs of the end user in the office and will usually be among the first to interact with any new technologies brought into an organization. Former secretaries also tend to understand the fear and anxiety end users feel when confronted with new technology.

Unfortunately, secretaries often don't have the technical or systems analysis background, Mayfield pointed out, and it is very difficult in many organizations for secretaries to move out of their slots into management.

It is clear, though, that companies forced to look in-house for OA staff are expanding their horizons far beyond MIS. Administrative departments of all disciplines are becoming resource centers for OA staffers. A liberal arts background rather than computer science training is becoming the preferred profile. Seeking professionals with good communications and writing skills as well as strong interpersonal capabilities has become the priority.

"You can take someone without a technical background and get them up to speed pretty quickly as long as they have the desire," declared Dale of Bank of New England.

At Avon, where the OA implementation is in a more advanced stage, Hart is seeing a change in the type of person interested in OA: a move from the technology-oriented type to more people-oriented applicants. "Technology is not the driving force anymore," he said.

Corporations are generally unwilling to discuss OA salaries, but Goldschmidt of Robert Half Associates pointed out that the salary range "varies all over the lot." Aside from managers, whose salary level would depend on any number of factors, OA staff positions for analysts, consultants and trainers would range from a low of around $20,000 for an entry-level post, to the low to mid-$30,000 level for more senior positions, he said.

Those who, despite the difficulties, seek to hire from outside the corporation are uncovering both expected and unexpected resources. The vendors themselves provide fertile territory, as do distributors and consulting organizations. Former teachers, unable to find work in education, are turning to OA in large numbers and organizations are finding the teaching skills an invaluable asset.

"We just hired a former English teacher with 16 years experience at a private school," related Dale. "He was tired of the education field and he is really motivated and driven. He's a little low on the technical side, but he has the good communication skills of a teacher."

With backgrounds such as teaching, in-house training is a must. Though many organizations have neither the time nor the money to invest in extensive retraining, industry analysts believe training will become a major concentration for OA departments.

At the Continental Bank in Chicago, an acknowledged frontrunner in OA implementation, bank policy prohibits the hiring of experienced personnel for any accounting or systems jobs. Instead, the bank seeks out recent college graduates who immediately enroll in a 15-week training program within the bank. The trainees are not brought in for a specific position; various related departments recruit them after they are in the program.

Ed Wundrum, manager of Continental's OA marketing group, pointed out that because the bank is in the advanced stages of OA, the staffers need to be even more sophisticated. He looks for people who are independent in nature, with a grasp for analytical work. They need, he said, the interpersonal skills to work with everyone from the clerical level up to senior vice-presidents.

In fact, two separate OA groups exist within Continental. The marketing group is responsible for applying technologies to solving business problems for the bank's 12,000 employees. The second group, composed of product managers, is mandated to upgrade the bank's current OA product line with new technologies. Both groups have drawn from the bank's training program and its supply of both computer science and liberal arts graduates.

According to Goldfield of the Omni Group, the OA groups in most organizations will evolve in two directions, in much the same way Continental has. She foresees the need for both strategic planners who know the technology and operations people who will manage implementation and use on a regular basis.

"Both these groups are hard to staff," she stated, "since office automation is just getting started and no one has done all of it as yet."

Dell of Diebold agreed and said the difficulty in finding quality applicants will keep the core OA staff small for quite a while. He predicted that OA will grow into more of a disciplined management function and less of an entrepreneurial activity and that the end users themselves will pick up the slack for the OA department.

"The core group will probably stick with design and implementation and leave the grunt work to the end users," he said.

Ironically, it is the end user who brings optimism to the bleak OA hiring picture. In many organizations, users are ingesting so much knowledge about the technology they need that they are often more well-versed than the office systems staff.

With the end user as the catalyst, solutions to the OA hiring mystery will undoubtedly be found.

"The changes will happen," Mayfield added. "OA is a huge growth industry and there is great opportunity in it." OA

Rifkin is Computerworld OA's senior writer.

MULTIVENDOR SELECTION

By William H. Allen Jr.

Several types of relationships are possible between a user and a vendor. Obviously, different relationships need different management responses. Although generalized, three types of vendors can be readily identified:

- The vendor that tries to become involved in customers' planning activities and to influence the direction to be taken.
- The vendor that prefers to take orders and ship products.
- The vendor that has a monopoly and is slow to respond.

These generalizations offer scenarios from which a plan can be devised.

The involved vendor — Initially, the involved vendor

sounds contemporary, interested and aggressive.

This description suggests a vendor organization with which everyone would like to work, but this may not be the case. All too often, problems are identified in the context of the vendors' products. This situation is automatically contrary to the philosophy of allowing multiple vendors to compete for business.

The criteria for selecting products are performance, price and support. Vendor involvement may be important in some instances, but in actuality the vendor's products are hardware and services, not planning and consultation.

The uninvolved vendor — The uninvolved vendor takes orders, delivers the product and presents an invoice. Although this type of vendor avoids involvement or interference in the customers' direction, this can present problems, too.

At one time, companies could depend on the vendors to recommend how specific products could be used. Recently, especially with respect to some smaller ticket items (for example, modems), members of the vendor's sales staff have appeared limited in their ability to compute costs and take the order. As a result, the office staff must be able to properly evaluate and configure the necessary equipment.

The vendors can transfer to the customers the cost of technical sales review and planning and, in some cases, installation. With an uninvolved vendor, a product without the desired capabilities may be mistakenly ordered because the salesperson is merely an order taker. The salesperson neither takes the time to study the organization's needs nor has the technical background to catch the error. This situation has a hidden cost.

Some smaller vendor companies do have lower prices, but they may also have little expertise available in their company to help their customers arrive at proven technical solutions.

The monopolistic vendor — The monopolistic vendor, a vendor that is the sole provider of a particular service needed by the company, is often the most difficult to manage. The difficulties encountered when dealing with this type of vendor include grappling with a large bureaucracy and sometimes trying in vain to secure an enthusiastic response whenever a problem arises.

Escalation of the problem is usually the only avenue of relief available. In this instance, the business cannot be switched to another vendor; therefore, the threat of that action does little to stimulate vendor activity. The best method of working with this type of vendor organization is to learn how it conducts business and who of its management personnel will help when a problem occurs.

Price, performance and support are important criteria for the office management staff to evaluate during the selection process. In the multivendor environment, operational problems may be reduced significantly if the criteria are expanded to include compatibility with other vendors and products; this refers not only to plug compatibility, but also to support compatibility.

Some vendors with very good products have rigid rules about interfacing with other vendors' products. Some may have problem-identification procedures that do not work well when their products interface with other vendors' products. Office management may have to decide whether to exclude these vendors or to use their products exclusively. Only an astute manager

can know which is most advantageous.

Some vendors may not accept nonstandard agreements. Vendors that will not modify their agreements can afford to take such a stand because their business volume is not significantly affected by the loss of a sale or two.

Such vendors are not necessarily small companies that are flexible in order to obtain business, nor does willingness to sign a nonstandard agreement indicate the vendor or its products are inferior. Most companies that accept such agreements have fine products, but simply ventured into the market years ago with this contracting flexibility and have been unable to change their stance.

A nonstandard agreement can be a significant advantage for the customer or can at least counter the vendor's advantage. Therefore, office management should consider this possibility during the evaluation phase.

A new dimension to the already difficult problem of managing the multivendor environment has emerged recently. Because of electronic office networks and distributed processing, office management now faces the task of coordinating multiple vendors in multiple locations. Although purchasing is typically handled in the central location, a great deal of vendor contact occurs at the remote sites, especially with vendor repair and maintenance personnel. Contract enforcement is particularly a problem.

Vendors may do a poor job of communicating with their personnel in cities outside the one in which the sale was made. Sales people stress the size of their maintenance organizations and their organizational structure, which suggest good communications and control of each problem. Almost invariably, however, the first repair person to show up at a new remote location reveals little knowledge about the operation and a lack of even the most cursory briefing.

There are other problems as well. Often, because the remote site is small, repair personnel treat it as though it were less important than headquarters in that city. Repair personnel may be in awe of large installations and may not appreciate that even though a node may have a small hardware configuration, each node in a network is important.

In very small cities within the network, spare parts and repair personnel are not available and must come from the closest large city, thus increasing downtime and maintenance cost.

The manager's efforts in these situations focus on contract enforcement:

A nonstandard agreement can be a significant advantage for the customer or can at least counter the vendor's advantage.

The manager seeks no extra services, but attempts to secure the minimum acceptable service. Two simultaneous avenues can be followed to achieve this result. The first is that the salesperson's responsibilities should not be ignored. As much pressure as possible should be placed on the sales group to communicate a description of the network to every office supporting the network.

The group should also emphasize to its repair and maintenance management that the customer is

Present shock.

The installers have left.

Your fully integrated multi-user word processing system is ready to go.

What's that? A couple of operators called in sick?

Now, what?

Suggestion: Call Manpower Temporary Services.

To provide the word processing operators needed in today's automated offices, we're training people daily. In Manpower offices on popular makes of word processors using our own Skillware® — instructional diskettes developed by and for word processing operators.

We've also introduced a series of machine specific operator support manuals that enable our temporaries to operate your word processors with more ease and confidence.

And we've designed innovative methods for identifying and verifying word processing skills of experienced operators so we can match the right temporary to each assignment.

For these shock absorbing reasons, call us whenever you need effective word processing operators to maintain productivity.

MANPOWER®
TEMPORARY SERVICES

demanding better service. The office manager should emphasize to the sales group that this problem must be escalated within its company and not be confined to the local level and that some evidence of its management's awareness of the problem must be forthcoming.

The second avenue consists of office managers making themselves known in as many remote locations as possible. On business trips to those cities, the manager should take the time to make calls in that location on the vendor personnel who will directly service the account. The manager should also meet vendor management. To improve personal relations, the remote site supervisor or a key network user should also meet occasionally with the vendor in that city. The vendor branch office must not be allowed to regard the remote site as merely another account number.

The best advice available on the subject of contract enforcement is to be prepared to pressure the vendor before an agreement is signed. In this situation, the nonstandard agreement is most beneficial; it can be written to strengthen the office manager's position with respect to contract enforcement.

For the most part, vendors do meet their responsibilities. They will not, of course, give anything away, and they may cut corners occasionally. They tend to provide their most responsive service to their biggest customers or to customers with pending plans for expansion. The agreement therefore becomes vitally important if the office manager is not among these customers. The agreement must state explicitly a level of service that defines the vendor's responsibilities. If the agreement is properly written, the manager must enforce it on every occasion in which the vendor does not comply. Otherwise, permitting the vendor to slip on occasion could become a precedent for future service levels.

Some costs involved in the management of multiple vendors in multiple locations are hidden. For example, vendors sometimes provide less service, which means more downtime. In addition, long-distance telephone and travel expenses are necessary to perform contract enforcement. Another hidden cost is that problems handled over the telephone take more time to solve and consume more staff and management time per problem.

In its long-range plans, office management must anticipate how vendor support will change and how this change will affect plans and budgets. Perhaps the biggest change in computer-based industry will occur in the relationship between vendors and their customers — a change in both roles and attitudes.

In the past, customers relied heavily on their vendors; for the most part, the vendor's support came with the product. One major change — unbundling — has already occurred. In the future, customers are likely to take on more problem-solving responsibilities. This idea is supported by the increased availability and sales of telecommunications and other testing and monitoring equipment and by the increased demand for people with specialized technical skills — equipment and personnel with capabilities once found only in vendors' operations.

program that will work in the multivendor environment.

- Encourage management, technical and administrative personnel to spend time developing credibility and personal rapport with vendor counterparts.
- Teach executive management about the costs of both personnel and tools needed to achieve possible savings from the multivendor environment. This is a difficult management task.
- Monitor and review procedures and continually make enhancements to guarantee that the desired approach is being followed. Don't assume that a solved problem remains solved.

When forecasting and planning, office management must anticipate the possibility that vendors will continue to withdraw support and service in order to maximize their profit picture. This action could pose serious problems to small operations.

The standard business practices of tomorrow will possibly resemble current OEM business practices. In the near future, customers may provide all but the most difficult portions of their own preventive maintenance and install a large percentage of their equipment.

The practice of employing multiple vendors will continue to grow despite the difficult managerial, technical and administrative problems. The economics are tempting to both vendor and customer. Because vendors are divesting themselves of providing full support, office management groups need to become correspondingly stronger. This strength will eventually help companies take full advantage of the multivendor environment.

When forecasting and planning, office management must anticipate the possibility that vendors will continue to withdraw support and services in order to maximize their profit picture. This action could pose serious problems to small operations. To some degree, such operations are prevented from taking full advantage of the market because they do not have the strong technical staff required for entering the multivendor environment.

Office management can consider whether implementation of the following steps would better organize their multivendor-environment management effort:

- Reorganize portions of the office management group around the vendors that supply the goods and services. This reorganization should take management, technicians and administration into consideration. For example, appoint a specific group responsible for telecommunications.
- Establish written guidelines for controlling the environment, including guidelines for vendor contact, rules for problem escalation and procedures for administrative authorizations.
- Implement a system support

- Involve the company's internal auditor, who might suggest procedures for dealing with vendors that protect the company and the office manager and ensure fair treatment of all vendors. The office manager must be aware that a staff member possibly could be influenced by something other than a vendor's product.
- Small office management groups that want to take advantage of the multivendor environment, but cannot afford the full-time technical staff might turn to the management information systems (MIS) staff or a large, neighboring data center in another company for help. There, the smaller organization might pay an hourly rate for technical help, as needed. This idea also appeals to the manager of the MIS operation or the other company because it defrays some of the cost of the large staff.

The approach an office manager must follow in managing the multivendor environment — defined by guidelines, procedures and rules — should be written and effectively communicated. A baseline should be developed for each logical segment of the operation. Problems and deviations must be recognized quickly and communicated effectively to the vendors. A deliberate attempt should be made to improve and maintain rapport, which should not be left to chance. No section manager or supervisor should have the option to manage vendor relationships in his own style; the style to be used is the one developed by the office manager.

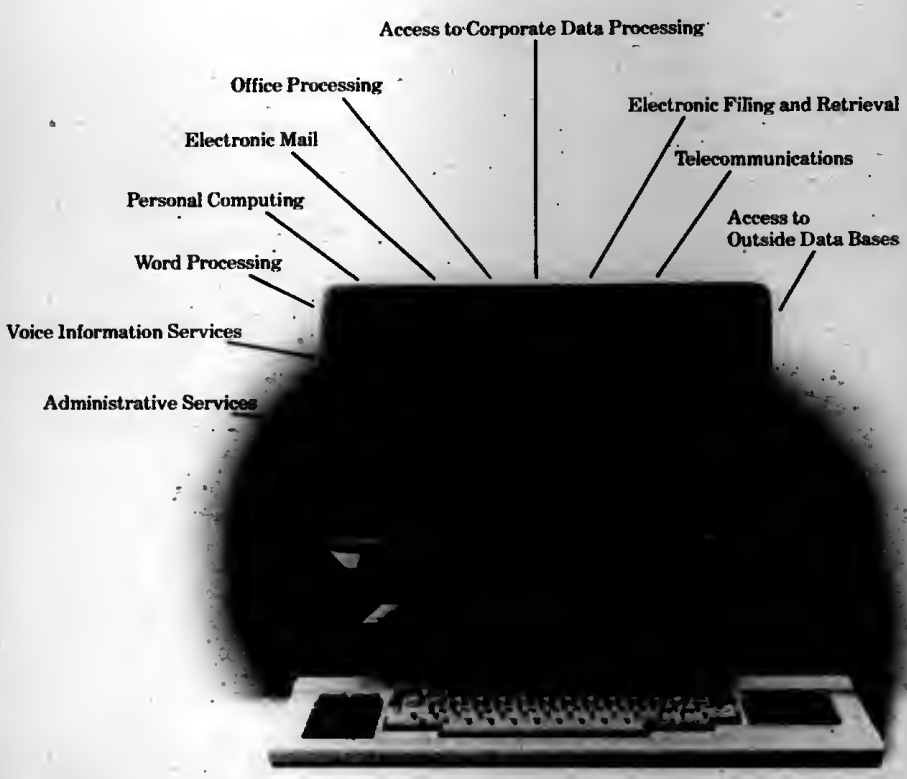
One must anticipate that problem solving in the multivendor environment will typically take longer than in the single vendor environment. To keep downtime to an acceptable minimum, the office management staff needs to identify problems and responsibilities quickly. After a chain of vendors is contacted and scheduled to work on a problem, downtime lengthens. Because the vendors cannot be made to work more quickly, the office management staff must make up the difference. This is why test and diagnostic equipment is so important.

Cost savings is usually the prime benefit cited for employing multiple vendors, but the ideas that these vendors bring to operations should not be discounted. New approaches to problem solving, the competition and the industry's expansion are contributions that grow out of the multivendor environment.♦ OA

Allen is vice-president of Jacobs Engineering in Pasadena, Calif.

This article is excerpted from The Electronic Office: Management and Technology, *copyright © 1983, published by Auerbach Publishers, Inc., Pennsauken, N.J.*

SPERRYLINK™
OFFICE SYSTEM



Just about the only thing it won't do is brew your morning coffee.

SPERRYLINK. The one piece of equipment that can handle all your office automation needs.

It ties into the central computer for mainframe information and mainframe support.

It's a data processor when you need to handle data, a word processor when you need to handle words.

It's a personal computer for filing, retrieving, keeping your calendar, your time schedule, your memo board.

And it's a telecommunications terminal with electronic mail and digitized voice capabilities—your link to the outside world.

This is the SPERRYLINK System. A system beyond conventional ideas of office automation. Beyond words and numbers, voice and image.

It's the one system that finally brings it all together.

Sperry Corporation, Computer Systems, Department 100, P.O. Box 500, Blue Bell, PA 19424.

SPERRY

We understand how important it is to listen.

SELLING THE IDEA

By David Shay

It is easy to justify office automation. Many people in OA today, including most vendors and many consultants, are throwing up their hands at the thought of cost-justifying the OA expenditure, whether they want to call OA an expense or an investment.

You can justify your OA expenditure, but first you must understand three key points:

- Different personalities — you and your boss, for example — may require different degrees of proof of justification.
- Traditional ways of cost-justifying factory expenditures do not usually apply in the office.
- People react differently to the dozen or so justification

HERO BREAKS DOWN OFFICE WALLS.

MDS HERO TRANSFORMS ISOLATED WORKSTATIONS INTO NETWORKSTATIONS.

The personal computer is not all pluses. This modern miracle of speed and precision has created a kind of cubbyhole mentality. Isolated, self-protective pockets of valuable information, inaccessible to other computers or the rest of the organization.

How will your company move forward when its best thinking can't even move from office to office? Your company needs HEROS™.

IN THE OFFICE, HERO UNITES AND CONQUERS.

HERO is the intelligent, desktop Networked Personal Computer from MDS. It does everything an ordinary personal computer can do. And lots that it can't. HERO can form interactive alliances with mainframes, trade information with other computers, make peace between departments and convert diversified knowledge into decision-making power.

HEROS LOOK GREAT IN BLUE.

HERO and IBM. Together, they're unbeatable. Mated with MDS SUPER 21™ Communications Processor, HERO slips comfortably into IBM SNA networks. It looks like Big Blue's 3270 SNA and 3776 remote-job-entry systems. And our MDS SUPER SNA™ option gets both on one communications link. Additionally, HERO runs MS-DOS software, as well as a fast-growing library of MDS software programs.

HEROS PLAY "SHOW AND TELL", NOT "HIDE AND SEEK."

HERO and SUPER 21 give you the power to liberate data from personal, departmental and corporate databases that used to play hard-to-get.

With INTELLIGENT 3270™ (an intelligence only MDS offers), your people can write their own programs and integrate them with data in the mainframe. HERO lets you access to the database, extract information, process it, display it, update it and utilize it. Then return it or store it right at the workstation.

MDS HERO WILL MAKE A HERO OUT OF YOU.

With HERO and SUPER 21, what's been out of control will soon be under control. Yours. And your current investments in data processing will pay off even more handsomely. Instead of your system not working, it will be networking. Efficiently, effectively and economically.

Not just in the office, but throughout your entire organization.

Furthermore, MDS systems are planned for non-obsolescence. They're modular in design to accommodate future growth. So, like a hero, every MDS system, is immortal.

TOGETHER, WE'LL MAKE HEROIC STRIDES.

MDS is a multidivisional, multinational corporation. We've grown by helping our customers to grow. We'd like to do the same for you. Not just in IBM country, but beyond.

Wherever you are, or want to be, we are. MDS offers service and support capability around the world. Around the clock.

Ask our customers about us. And give us a call. Dial **800-MDS-HERO.** Together, there's no barrier we can't break through.

MDS MOHAWK DATA SCIENCES

7 Century Drive. Parsippany, New Jersey 07054 And over 430 locations, worldwide

arguments, so you should find the boss' hot button and go with it. There is no right or wrong justification argument.

To understand the first point, we must understand the psychology of the rate at which different people adapt to something new. Almost everything in life follows the normal curve or distribution, and the technology acceptance curve of OA is no exception. The technology acceptance curve is composed of four major groups, three of which can be associated with a dominant personality type. At the beginning of the curve are leading-edge people and early adaptor people. The personality type associated with leading-edge and early adaptor groups is that of the innovator. These people will try almost anything new; they require little or no justification for purchase beyond feeling that the purchase is sound.

Leading-edge people probably had personal computers three years ago; the early-adaptor people are piloting and experimenting with OA now. Together, these two groups represent approximately 15% of the population.

A large percentage of the population is currently interested in and investigating OA; they are called the early majority. They are utilitarian, and the personality type associated with them is that of the activator. The typical activator is the busy production manager or sales type with the cluttered desk.

These people recognize the usefulness of the new technology to one or more facets of their daily tasks, purchase it and quickly compute a pay-off agreement in their minds. They then go on about their business. The activators represent about 35% of the population.

Together, the innovators and the activators represent about half the entire population of U.S. business; they have OA installed. A full 50% of the population is now up the technology acceptance curve, and the stage is set for the entrance of the late majority or the controller type.

The late majority represents 35% of the remaining 50%. After half of the entire population of U.S. business has OA installed, the late majority will decide to start piloting and experimenting with OA. This group is usually very precedent-oriented; it plans the future based upon the lessons of the past. It is characterized by the personalities of the attorney, the controller, the management information systems (MIS) executive and many other executives who have climbed the ladder of corporate success.

These people want a relatively safe bet, which they can defend to their bosses and peers. As they see it, OA is not yet a safe enough bet for them to put their careers on the line. The issues are still too fuzzy.

The final 15% — the last community of skeptics — will come on board only many, many years later, if ever.

We have to use new techniques in the office for justification.

In its major contribution to understanding the knowledge worker, the American Productivity Center concluded in its report, "White-Collar Productivity — A National Challenge," that "the first step to greater white-collar productivity is to recognize that what works in the plant won't necessarily work in the office. Time/motion studies may produce positive results in some clerical areas, but the lessons of industrial engineering are, for the most part, of limited value, because in many situations white-collar work is not patterned or sequenced and does not result in a tangible product."

One of the major recommendations of the panel on the knowledge worker for the recent White House Conference on Productivity was to "reduce the emphasis on case-by-case justification of isolated information technology purchases. Instead, examine the overall effects of investments on business unit productivity and on the quality of services."

The justification arguments of the farm didn't work in the factory, and we can't expect the justification arguments of the factory to work in the office. We are now in an information age, and a variety of justification techniques can be applied.

Hard-dollar savings is the most "factory traditional," the most sought after, frequently the most elusive, the most difficult and perhaps the most dangerous form of justification in the office.

Because the easiest target for automation is a highly repetitive clerical-type function, many people try to automate typing and attrition off a secretary to pay for the equipment. Typing is less than 2% of the cost of running an office. I strongly advise that the time saved by automation in the secretarial ranks be used to support the professionals, managers and executives rather than to lay off secretaries. These higher paid people are distracted from their personal effectiveness by spending close to 20% of their time performing administrative-type tasks that they find tedious but that a secretary might find rewarding.

There are some hard-dollar savings available through OA, however, that you can use in justification arguments. Frequently automation smoothes the peak-load problem in a department, thereby saving the budgeted cost of such items as temporary employees, overtime, overnight couriers and long-distance calling. Some systems speed up the sales or collection cycle fast enough to save the hard-dollar carrying cost of a day of inventories or receivables.

Other hard-dollar savings include having certain items produced in-house. These might include slides, graphics, large proposals and mass mailings. In some instances, teleconferencing technology can save travel cost, and voice or electronic mail can save on lengthy telephone calls. It is possible to juggle enough work among various intelligent workstations that the labor grade for a whole job can be lowered, which is also a hard-dollar savings.

Hard-dollar savings is the most "factory-traditional," the most sought after, frequently the most elusive, the most difficult and perhaps the most dangerous form of justification in the office.

Most OA applications can eliminate forms because you can combine work steps and stations. Remember, the hard-dollar savings associated with the annual purchase of the forms have been estimated by experts to be only 5% of the total cost of the form. The other 95% is a soft-dollar savings associated with the purchasing; recordkeeping; inventorying; and the completion, inspection, data entry, computer processing, distribution, reading, copying, filing, and/or disposal of the form.

Soft-dollar savings is really a very broad category of savings. I like to define these savings more narrowly as improvements in a process which are immediately recognizable as beneficial, but which can probably never be converted into a measurable benefit. The ability to communicate smoothly across town or across time zones is an excellent example of an immediately recognizable benefit of today's telecommunications technology. So is the memo that is better prepared and produced more quickly for the executive supported by word processing.

As time goes on and we learn more about measurement, the soft-dollar category will shrink. A company need only see noticeable increases in salesmen's productivity as a result of the communications gear, and the soft-dollar savings can be moved over to the hard-dollar column as profit margin on incremental sales.

Some other hard-to-quantify benefits often quoted as soft-dollar savings involve the higher quality of correspondence and communication associated with a smoothly produced document on word processing; the decreased need for travel as a result of better communications; faster communications; more time for more complete analysis; better decisions; and fewer problems with time zones.

Cost avoidance is a popular form of justification for OA. Unlike a hard-dollar savings, which is a savings against an actual or budgeted expense, cost avoidance says "I will not have to spend unbudgeted money I know I would have spent." Good examples are avoiding the inevitable new hire next year, absorbing peak work loads or new government regulations that would have forced the company into using outside services or overtime in the past.

Task delegation is one of the most promising forms of cost-justification associated with OA.

Study after study shows that managers, technical and professional knowledge workers spend over 20% of their time (and probably 30% of payroll costs in an average company) on administrative work. That is an hour and a half daily of administrative tasks that could be delegated to lesser paid individuals more qualified and more challenged by these tasks.

If OA frees two hours a day of administrative support personnel time, do not apply the factory mentality of laying off every fourth administrative support worker. Rather, go find those easily transferable tasks and move them from the principal's desk to the support person's workstation. This is job enrichment at its best, as well as bona fide cost-justification. In one organization with support personnel with a fully loaded cost of $7 an hour, it was possible for OA to attribute three hours savings daily per person. No one was laid off, but three hours a day of regular administrative work could be delegated to administrative support people. The company saved $30 by transferring that work to the support person and the support person had a more challenging day. In addition, the senior staff had more time to perform the analytical work they were hired to perform.

Time savings is another form of soft-dollar savings. In the clerical ranks (as with the factory worker) an hour saved will not become dollar savings unless management takes care to schedule another hour of work for the person involved. This factory mentality is one reason why many managers are skeptical of savings from OA.

To be sure, if you roll in a word processor, save someone an hour a day and do not add more work or transfer work, productivity has suffered. You have not changed the output, but you added $12,000 or more to the input.

The majority of the white-collar head count and the lion's share of the payroll, however, goes to professionals, technicians and man-

At last, a system with a head for numbers, an eye for pictures, and a mind of its own.

Introducing the Kodak KAR-4000 information system. Take the processing power of a stand-alone computer. Add a "photographic memory" to access original document images. Top it off with comprehensive, one-source software and service.

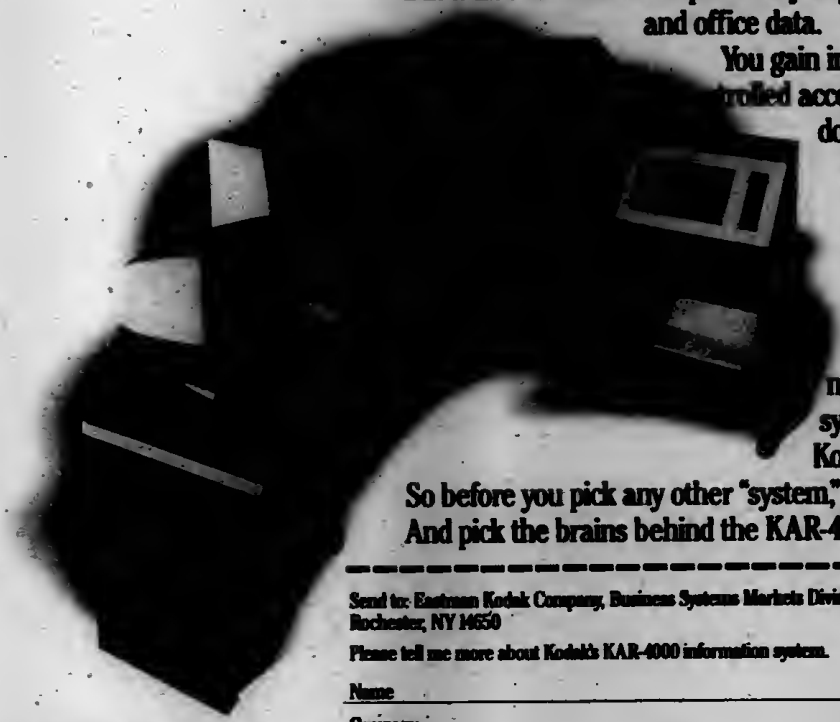
The result: a Kodak KAR-4000 information system.

It outperforms any other computer-assisted retrieval system. But it also functions independently to process both documents and office data.

You gain independent computer-trolled access to on-line data and documents. Without the staggering expense of on-line computer storage.

You even gain independence from service—all components in the KAR-4000 system are serviced by Kodak.

So before you pick any other "system," send in the coupon. And pick the brains behind the KAR-4000 information system.



The Kodak KAR-4000 information system. It gives the computer a photographic memory.

Kodak

Send to: Eastman Kodak Company, Business Systems Markets Division, Dept. DP4514
Rochester, NY 14650

Please tell me more about Kodak's KAR-4000 information system.

Name _____

Company _____

Address _____

City _____

State _____ ZIP _____

Please answer the following:

1. How many incoming documents per day do you process? ☐ 1000-2000 ☐ 2000-5000 ☐ Over 5000
2. How many documents do you normally retrieve each day? ☐ Less than 10 ☐ 10-25 ☐ Over 25

agement. If you save these people an hour, they will use it (probably as efficiently or effectively as they spend the rest of their day). I recommend that we convert these hour savings into time for cost-containment or revenue-producing idea sessions. Even if OA saves a principal only one hour a week, we can isolate that hour and put it to work.

The second major set of justifications for OA — value justifications — generally has little to do with dollars that might eventually hit the bottom line, but more with the quality and value-added aspects of performance.

Quality of work life and job enrichment studies in the U.S. are demonstrating dramatically that happier employees are more productive employees. This type of performance seems to affect the bottom line, although it is difficult to formally trace the connection between a happier, more cordial receptionist and increased sales.

If you introduce automation to get rid of tedious, boring tasks and then add some spice to the person's life, you use OA to get a happier employee who will be more productive. On the contrary, if you take typing away from all secretaries, send it to a WP pool and increase the number of principals the secretary supports, you will probably have some less happy and less productive folk. A WP pool does have merit in many places, but by and large the typing pool is an obvious example of hold-over thinking from the industrial age the U.S. left when it entered the information age. Companies were probably looking for hard-dollar savings when they invented the typing/WP pool. Worse than that, pools have buried very valuable technology in the corner or the basement.

If the early and late majority people could see that technology working on desks around them, they would start to see valuable applications for the equipment.

In addition to enriching jobs, OA can frequently improve employee morale and, ultimately, productivity. It does this by smoothing down chaotic peak loads; eliminating boring work valleys, where people feel they have to stretch out their work; and by introducing a wider variety of work.

Lower unit cost should be a major accomplishment of OA and is one of the most convincing arguments for the early and late majority decision makers. Even with no layoffs, a good manager can understand that if the old cost was $10 per transaction and the new cost is $8, he can add substantial volume to a department without adding new resources. However, a word of caution: Don't be amateurish in determining unit cost. Do your accounting homework. You do not want to present cost data to management as justification and then have an accounting technician blow a substantially sound argument out the window because you didn't realize a task was fixed or semi-variable or you did not use a full absorption overhead formula.

Because the OA workstation has the inherent capability to do so many different tasks, it invariably lowers the unit cost because there are fewer steps, such as editing, checking, recalculating, forms, stations, time, supervision, error correcting and inspection time per invoice, order, new hire, proposal, benefit claim and customer inquiry.

Streamlining the operation is another of the more promising areas for OA. Probably the biggest contribution to the explosion in the use of personal computers is the ability of the OA workstation to perform so much work that used to be compartmentalized and specialized in the factory mentality.

There should be little doubt in the mind of even the most skeptical manager when OA can bring about a completed transaction by two people in three steps instead of the old 13 steps in three departments by seven people, with considerable delay in everybody's in basket and out basket. Every time a paper has to move, it requires some form of preparation to leave a workstation and then some form of preparation before it can be worked on in the next department. OA can eliminate all these little clearinghouse operations, which added no value, just cost, to the end product.

In addition to enriching jobs, OA can frequently improve employee morale and, ultimately, productivity.

Increased service is another benefit. Whether we are in factory or service jobs, we have customers or clients that reward good service by repeat business. Banks and insurance companies might be obvious examples of firms that will pay handsomely for service-increasing devices, but all firms should recognize their importance. OA can frequently increase the response time to customer inquiries, reduce the errors in processing, produce more concise and accurate responses, capture data for trend analysis, provide faster response on pricing or transaction status and so on.

Time saved for value-added activities offers another area for justification. Under cost-justification, we recommended that some of the time saved for principals might well be isolated for working on cost-containment or revenue-producing activities, brainstorming or task forces. Some of this time saved should also be singled out for value-added activities.

Suppose OA saves a principal one hour a week. Set up a rotating schedule on that individual's calendar to spend every Monday from 11 a.m. to noon on some critical topics and at the end of the year the department will be running substantially better because of that 50-hour block of time. These topics include more time with customers, planning for next year, scheduling work better, desk-checking employee work, counseling employees, training employees, writing policies and procedures, writing job descriptions, setting goals and holding department meetings.

All these tasks add value to an organization and management is always complaining that they have no time for them. OA can fill this gap.

Although the guidelines above can help justify OA, it is ultimately up to the OA committee or department to produce appropriate and valid justification arguments that will satisfy their particular managements and will allow their companies to enter into the office of the future.

One last word of caution: Entrepreneurial, fast-track, high-tech companies are frequently managed by leading edge early adaptors and early majority people that quickly grasp the inherent productivity gains available through OA. Many of these companies are off and running with OA and experiencing the benefits of cost-justification and/or value-justification, whether they cared to stop and measure the results or not. (They usually do not.)

If your company or your company's OA program is managed by late majority personalities who prefer to wait until 50% of the nation is doing something first and not suffering from it, you may have a competitive problem. I recommend you quickly dig up those convincing justification arguments in your company so that it, too, can enter into the office of the future. OA

Shay is a manager in the New York office of Peat, Marwick, Mitchell & Co. and heads up the firm's white-collar productivity practice on a national basis.

ORCHESTRATING CHANGE

By Vernell K. Munson

A major obstacle to implementing office automation today is the traditional "bean counting" approach frequently applied to measuring productivity. That method may have worked well for the application of early computer technology, but it is no longer appropriate for the advanced technologies designed to support the individual consumer of the office environment.

An effective strategy for introducing new technologies in such nontraditional areas as professional, managerial and executive support goes far beyond basic training and end-user involvement in the design and selection of technology. At least in a general sense, users must understand how OA is going to change the way they think about their work and

about their expected roles in the process.

Until recently, computers were seen mainly as a means of handling more efficiently the input-process-output aspects of office work already being done. Office systems analysts found earlier factory work flow models useful in identifying where and how to apply early computer technology to achieve fairly well understood benefits — such as lower transaction costs.

Today, however, technology is moving beyond these infrastructural systems of the office toward support for the professional, the manager, the executive and — in a larger sense — the general business needs of the organization.

We still know little about how, in the long term, the individual knowledge worker will actually use new products and technologies developed to support managerial work. We do know that advanced technology holds great promise for nonquantitative, nontransactional office work. We also know change can be painful.

Success in introducing OA into nontraditional areas depends on the effective management of the process of change. Future users of a new technology need to learn more than how to push function keys — they need to be aware of and accept the need for changes in their own attitudes and behaviors and, ultimately, in the organization itself.

The traditional approach to using an office system to solve a business problem has been to define the problem in terms of the system's capabilities rather than to identify a business opportunity first and then look for an appropriate technological solution.

This focus on technology rather than on business is usually the first (and often the fatal) mistake companies make when developing implementation strategies for OA. Simply automating the artifacts of the office, such as calendars, "to do" lists and telephone directories, does not ensure a more effective and efficient office.

More specifically, if an individual has a time-management problem, putting his manual calendar on a computer does not guarantee that the person will manage his time better. Rather, the systems analyst and the user need jointly to rethink the work process involved. Before deciding on an automated approach, they need to analyze what has to be done when and why, and to identify the objectives and expectations that shaped the existing system.

If we shuck the old methods, how do we develop strategies for introducing advanced technologies into the office? One of the biggest difficulties for an organization is to identify a business opportunity correctly and then to choose technologies that let it take advantage of that opportunity. Taking off the blinders and seeing the forest and the trees requires discipline. The most effective approach is to integrate technology planning and business planning.

When the reason for introducing new technology has been determined, equally careful planning is needed for the next step — deciding what change is to occur and how to make it happen. Most companies tend to see training as the entire solution. They identify what applications will be automated and who will perform them. Then they send these employees off in a training course, where they learn how to push the buttons.

The traditional approach to using an office system to solve a business problem has been to define the problem in terms of the system's capabilities rather than to identify a business opportunity first and then look for an appropriate technological solution.

This approach works if the job is fairly routine and has been correctly analyzed, and if the users learn the new way of doing their jobs. Managers and professionals, however, may use a given technology in different ways to do their jobs. Therefore, training professionals to push keys does not guarantee the change will stick.

For example, the office systems group of a major insurance company decided its in-house lawyers would benefit from personal use of management workstations offering automated calendars, "to do" lists, telephone directories and other functions.

The legal department's secretaries were trained on the product and used it mainly for word processing. The lawyers were not given training because it was assumed they would learn from their secretaries how to use the terminals. Some basic applications — such as the department's library check-out system — were transferred to the system.

After six months, the department manager decided to keep the terminals, but only for the clerical staff. The lawyers had seen no benefit in changing their old ways. Many said they didn't understand all the excitement. They saw the terminals as toys, not as tools to help them do their jobs.

The problem, of course, was this implementation strategy lacked many ingredients necessary for the successful establishment of a new way of thinking. The introduction of the new technology should have been part of the senior-level planning process. Members of the management team, however, were treating the department members like guinea pigs. They did not see the terminals as solving a specific problem and did not view the decision to use them personally as essential for the lawyers to meet personal or departmental objectives.

Neither the lawyers nor the secretaries took part in the decision to acquire the terminals. But WP helped the secretaries so much that they overcame any initial resistance to change they may have felt. Otherwise they, too, would have gone back to their old way of doing things. At some point, ownership of the decision to change must transfer from the original decision maker to the person experiencing the change if the changed behavior is to stick.

A new technology may solve the problem that prompted the users in consider change, or it may offer a means of doing something not possible before. For example, the marketing department of a furniture manufacturer implemented a digital voice store-and-forward product. The decision makers correctly believed the system would solve the department's telephone tag problem. But it also opened up opportunities for communicating in ways not possible before. In retrospect, eliminating telephone tag turned out to be less significant than the fact that system users solved other problems — and created new opportunities — through creative application of the technology.

For an organization to adopt a new way of thinking, each individual must know about the coming change, develop a positive attitude and at some point assume responsibility for making the change. When employees brag about how they now do their work on a terminal instead of the old way, it is clear they own the decision to change and do not feel it was imposed on them. Pinpointing factors that cause people to change is part of successful change management. For example, the desire to maintain a competitive edge led the public relations professionals of a major financial institution to switch from typewriters to word processors. Although they had considered WP to be strictly a clerical tool, seeing one of their peers increase his productivity by using WP convinced them that, in order to get ahead, they would also need to use the new technology.

In addition, the apparent limit on the number of available terminals prompted staffers to ask for a workstation quickly before the supply ran out. After they requested the terminal — thereby owning the decision — they did not complain about change and worked nights and weekends to learn how to use it. The entire department (there really were enough terminals to go around, of course) was using WP within only a few months. The department manager said later that if he had mandated change, the staff would have resisted or possibly refused outright to get involved. He identified the right technology and the right motivating factors and, in a sense, let nature take it course.

Underlying the process of managing change are two assumptions: A desired change will be for the better, and the choice of technology is the right one. The right technology may solve either a perceived problem or a problem not immediately apparent when the process was set in motion, or it may offer an unforeseen opportunity to do something that couldn't have been done before. If the perceived value of the change outweighs the perceived cost — including the pain of personal change — it is likely the change will stick and the technology intervention will be successful.

In evaluating results, managers should not insist on a direct relationship between their expectations and reality. The furniture company, for instance, would be shortsighted if it judged the impact of voice store-and-forward system only against the elimination of telephone tag. This would ignore the unforeseen positive results that were not built into the assessment model. Nor should OA planners focus on the product as the critical variable. The product is a neutral element. It is the change management strategy that determines success or failure.

More and more OA products whose ultimate impact on the office will not be well understood for some time are finding their way to the desks of knowledge workers. As this happens, office systems planners are going to find traditional input-process-output models less and less useful. What they need now are approaches that incorporate the theory of change management.

The diffusion of innovation within a culture — in this case the office — follows a known pattern. After it has been developed and tested, an innovation, along with good reasons to accept it, must be communicated to those who are expected to change. People need time to adopt or reject an innovation. Change occurs if and when the innovation is adopted.

The challenge and opportunity we face in implementing OA technology is to shorten the cycle of innovation diffusion and adoption. We must develop new strategies tailored to the nature of knowledge work if we are to manage the introduction of new technology effectively and to realize the promise of office automation. OA

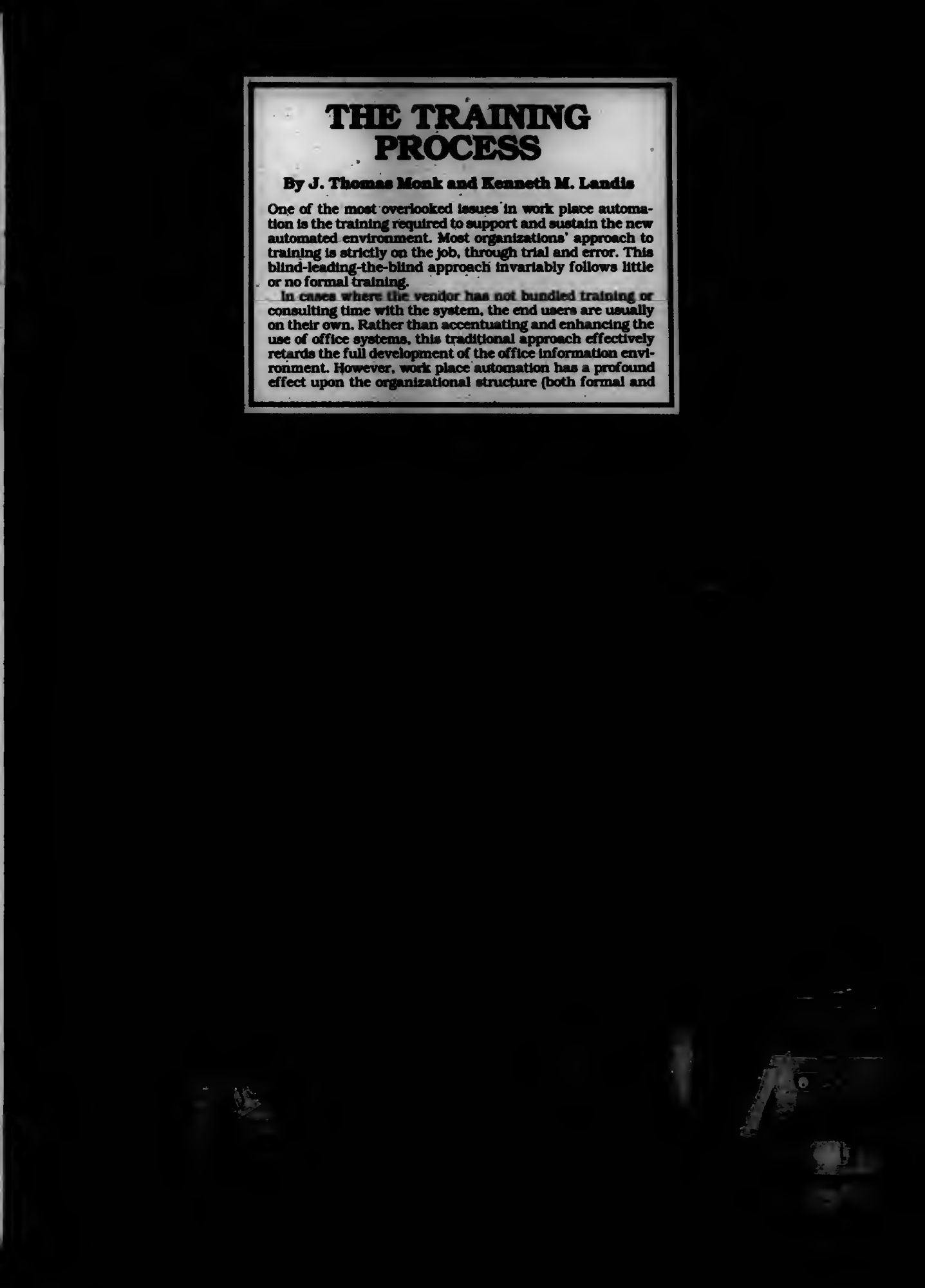
Munson is manager of the Advanced Systems Laboratory at Wang Laboratories, Inc. in Lowell, Mass.

THE TRAINING PROCESS

By J. Thomas Monk and Kenneth M. Landis

One of the most overlooked issues in work place automation is the training required to support and sustain the new automated environment. Most organizations' approach to training is strictly on the job, through trial and error. This blind-leading-the-blind approach invariably follows little or no formal training.

In cases where the vendor has not bundled training or consulting time with the system, the end users are usually on their own. Rather than accentuating and enhancing the use of office systems, this traditional approach effectively retards the full development of the office information environment. However, work place automation has a profound effect upon the organizational structure (both formal and



informal) and upon information flows and individual jobs. New approaches to training might indicate ways to help the user incorporate these tools in his own work style.

One of the challenges of work place automation management is delivering the necessary training to the appropriate audience. Training, not technology, provides the vehicle for improving organizational effectiveness. The technology is nothing more than an "information engine," and the end users are the engineers. Training in the automated work place should be defined as the vehicle to promote both effective and efficient use of information.

Why make the investment? Because information is an important business resource and must be managed with the same intensity as other business resources, such as personnel, plant and equipment and cash. It is standard practice to have specialists handle important business functions such as compensation, benefits and facilities management programs. Although work place automation does not produce information specialists, training must focus on the use of the available tools and technologies to allow users to do their jobs better.

Even when presented with this unique opportunity, organizations still do not emphasize training; in many cases, they may even relegate it to unassigned or second-tier personnel. For an organization to achieve maximum return on investment from the use of technology in the work place, a directed, viable training program is mandatory.

The decision to employ technology vs. existing operations to support a business strategy is only the first step. The equally important decision must be made to invest in the training necessary to ensure that the technology succeeds. Any organization wants to make optimum use of its information. To ensure this, training and development programs and services must be developed, implemented and coordinated to meet both business and human needs. If either of these two needs is overlooked, the new information automation systems will be viewed as either another edict from management or, even worse, as job threatening.

These programs and services must simultaneously address both technical and professional skills training needs, which will evolve as a result of the new information environment. Because of this critical need to synchronize training, the training strategy must be developed in the same manner and with the same attention to detail as a business strategy developed for the delivery of goods and services in the marketplace.

The first task in the development of a training strategy is the identification of the target market or audience. In any organization, whether a Fortune 100 corporation or a private business, the work force can be segmented into discrete groups for which a training product can be developed.

The technology is no more than an information engine and the end users are the engineers. Training in the automated work place should be defined as the vehicle to promote both effective and efficient use of information.

For purposes of illustration, let's look at a company that decided to use technology to solve a business problem. The name and business of the company have been changed.

The Triangle Magnet Co., located in the Midwest, has 500 employees. In early 1983, after pursuing an aggressive two-year growth plan, Triangle's management realized that, because of the business' growth, they now had serious problems processing orders; communicating price changes; and coordinating the activities of the marketing, manufacturing and home office support groups.

The executive vice-president of operations commissioned a study, which resulted in the acquisition of an integrated office information system. The system encompassed all the home office departments and all the regional offices of the firm. A key point of the study was analyzing how the employees of the company used

and disseminated information.

Based upon the results of their study, Triangle Magnet segmented its work force into the following categories:

- Decision makers or decision information users: 10%.
- Staff members or information handlers and processors: 60%.
- Manual laborers or questionable users: 30%.

Triangle Magnet's objective and justification for investing in the office system was to use the technology, coupled with a training and education program, to increase the percentage of decision information users in the company. By teaching the information handlers and processors to use information effectively, this group could increase its span of control and, in effect, could become decision makers. This in turn would enhance Triangle's ability to respond to changes in the business environment.

One of the most important issues a training philosophy must address is that of personal fears. This anxiety will take many forms: For some, it is the fear of failing in front of peers or subordinates; for others, the fear of trying at all.

The study also indicated that, from a technological and managerial perspective, Triangle's office operations were years behind its marketed products. The introduction of the new system provided the company with an opportunity to reorganize and streamline its operations at the same time it introduced the new information tools. Triangle also had an opportunity to increase the effectiveness of members of the category called "questionable users." Under the auspices of the training program, TMC's management made a conscious effort to identify and groom high-potential candidates from this group.

To develop a cohesive training program, companies must adopt and standardise on a training philosophy. A successful training philosophy for work place automation reflects management's needs and concerns and is sensitive to the needs of the target audiences.

One of the most important issues a training philosophy for the automated work place must acknowledge and address is the issue of personal fears. The introduction of technology will cause varying degrees of personal anxiety at every level of the organization. This anxiety will take many forms: For some, it will be the fear of failing in front of peers or subordinates; for others, the fear of trying at all. A key element of a successful philosophy is a plan to minimise personal exposure, thereby reducing fears.

An equally important issue is the differentiation between management skills and job-related or task-oriented skills. Each segment of the work force requires different skills to perform its function for the organization. The training philosophy that explicitly acknowledges these differences provides the foundation, direction and scope for developing the training strategy and subsequent programs. The training philosophy defines the training that each segment of the work force should receive to support the business.

Developing the training strategy: The combination of the training philosophy and the composition of the target audiences defines the training strategy. Each segment of the work force requires a basic set of managerial and job-related skills. In the case of Triangle, the strategy was:

- To provide the decision information user segment with management development training, which would represent investment in this segment and would provide the basis for succession management.
- To provide the information handlers and processors with training that would enhance the skills necessary to accomplish their present jobs. The training would be tailored for new personnel. Training for the current staff would be flexible in order to accommodate changing job dynamics caused by the new technologies.
- To provide the questionable segment with specific training that focused on a particular task for a particular reason. This group would be exposed to only those

subjects required to do a specific job because this segment's present work load was, in the classic sense, a textbook example of Taylorism.

Training techniques and systems: The inventory of training techniques and systems available is limited only by the creativeness and skills of the trainer. Technology has advanced to the point where multimedia presentations are no longer prohibitively expensive. As the cost of human resources continues to rise, alternative training techniques become more feasible.

While deciding what form of training systems will be both appropriate and cost-effective, organizations must consider an important relationship: the depth of knowledge required vs. the investment required. A training program that falls one dollar short of what's needed can destroy the potential of a million-dollar system. A well-defined program reflects management's expectations. The actual training techniques will depend upon the investment, the target audience and the depth of knowledge required (the philosophy).

Training techniques can be traditional, technological or innovative.

Traditional training includes the one-to-one relationship as well as lectures, workshops and seminars. This category may be the most expensive to implement because of its high labor intensity. As the size of the target audience increases, the resources must be increased proportionally or the schedule of events must be extended.

The traditional approach is better suited for developmental training; it facilitates the exchange of concepts and ideas by creating an atmosphere for dialogue. In many instances, the traditional approach becomes synergistic as role playing emerges. Nevertheless, the traditional approach is neither cost-effective nor good for specific skill training. The one-to-one relationship is direct and personal, which in many cases causes the training program to appear management-oriented rather than product-oriented.

Triangle believed the traditional approach would be a good investment for its management group. Individuals were selected for training in project management, the general management skills of coaching and counseling, effective speaking and writing and interpersonal skills development. What was interesting, however, was that Triangle also chose to use one-on-one coaching when they had installed the new equipment and were ready to implement the new system and procedures.

Because Triangle considered it important to minimize personal risk, it decided to introduce the new technology through traditional one-on-one and small group seminars. Other companies have followed this philosophy by teaching basics to peer-level managers in a workshop setting and then allowing each person to use the technology as he desired. Personal consulting should also be available, as the manager requires it, to enhance the benefits derived.

Triangle wanted to use technology to approach its information handlers because specific skill training requires a structured environment of: Input → Practice → Feedback → Motivation. In the past, the company had taught the use of the keyboard in a classroom setting, and the training proceeded at a set pace. This technique worked well for fundamentals, but as the personnel became more knowledgeable, the approach became less and less attractive because of time constraints and costs.

After the staff learned the basics of the new system, Triangle decided to use computer-assisted instruction (CAI) and multimedia tutorials to teach the new office practices. The investment required was a one-time cost to develop the office policies, procedures and tutorial, plus the cost of the vendor-supplied CAI package. The CAI package was a structured tutorial that used reinforcement through testing and self-paced advancement.

New training technologies have provided many other cost-effective alternatives for exchanging information and establishing a knowledge base. Videotape presentations have proven effective for presenting overall concepts or ideas. One technique that works uses a known expert to lend credibility to a program. Videotape is an excellent vehicle for demonstrations or for illustrations of current situations (such as work flows) and how they will change in the future.

When combined with workbooks, videotapes become multimedia. When the desired result is more skill-oriented, a more active medium is required. In this case, you need to integrate hearing and seeing, as well as doing.

The use of television has greatly increased recently for such things as behavior modeling and modification, guided discussions (with a trained group leader), experiential learning, live demonstrations or classroom simulation. When television-based training is carried to its limits, videoconferencing and in-house closed circuit networks are the result.

As work place automation matures, vendors will enhance the usefulness of on-line Help facilities. Nevertheless, the user will need a base knowledge and understanding of equipment operations before on-line facilities will have an appreciable impact.

The strength of on-line Help facilities is that they provide a single automated reference manual for a user when questions arise. A good Help function will provide available alternatives, including an explanation of the alternatives, at the point where the problem occurred. More recent versions also allow data to be entered from the Help screen and then passed back to the point in the program where the trouble occurred. Help is an excellent way to provide initial training as well as continual reinforcement after the process has been implemented.

The innovative training category is really only a combination of traditional and technological methods with the objective of using resources effectively. Triangle wanted to teach very specific job-related skills to its "questionable" segment to improve production efficiency and to decrease the cost of manufacturing its products. Printed job aids had effectively provided quick answers for many day-to-day questions for this group; Triangle therefore developed a series of plastic-encased aids, which were placed at each workstation in the production process. When an employee had a question, he would use the job aid before he called a supervisor; as a result, a majority of problems were solved immediately. Triangle's job aids formed a good way to allow training to be used to address "nonroutine" routine problems. Classroom training was offered on a regular basis to the supervisory personnel.

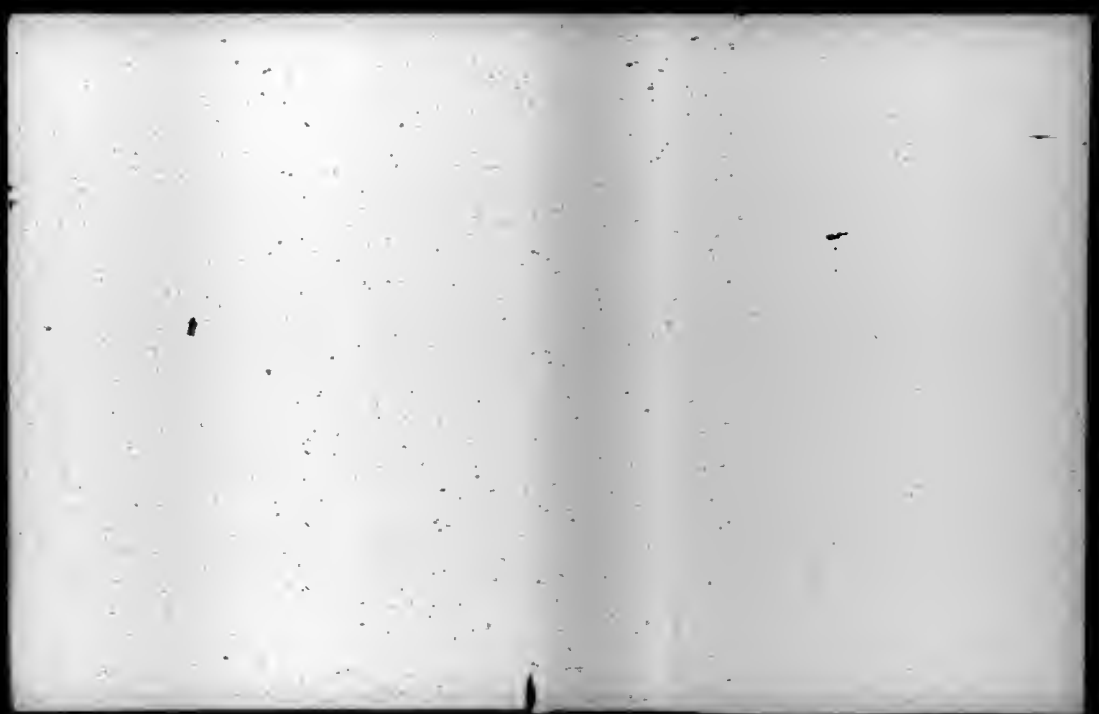
As a direct result of its philosophy, Triangle adopted another approach to training. Employees throughout the organization's departments had been identified and targeted to play a key role in the training strategy. These employees demonstrated a high potential for advancement at the company through job performance and willingness to accept additional responsibilities. This group was offered a completely different training series that included both technical and subject matter training. Triangle's management called these employees "lead implementors."

A lead implementor was an employee with a functional business background rather than a technical background. These people were able to communicate in nontechnical terms; as a result, they were able to understand fully the business requirement. Triangle found that the offices that had lead implementors quickly started using the new integrated system because the lead implementors could translate the business requirement into an automated solution in language the other office workers understood. The lead implementors became a virtual extension of the training staff, providing a constant, on-site resource.

In the final analysis, work place automation is not just installing new equipment and issuing a new set of policies and procedures. The human resource is often the critical success factor within the new environment. Training, then, becomes paramount and usually represents a greater investment than that usually contemplated. Many vendors offer some training, but this training is either too technical or too skill-related for both information handlers and decision makers.

Successful users of work place automation have developed unique approaches to training by adapting various techniques to their unique needs. These companies have been successful because they took the time to define their objectives and training philosophy and because they implemented strategies that deliver the appropriate amount of knowledge at the appropriate level within the work force. OA

Monk is vice-president of resource management with Citibank in St. Louis and Landis is implementing corporate/office systems at a Fortune 100 manufacturer based in St. Louis.



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 709 FRAMINGHAM, MA 01701

postage will be paid by

CIRCULATION DEPARTMENT

COMPUTERWORLD

375 Cochituate Road, Rte. 30
Box 897
Framingham, MA 01701-9985

VOICE-DATA PBX DEBUTS

BY JOHN COMBS

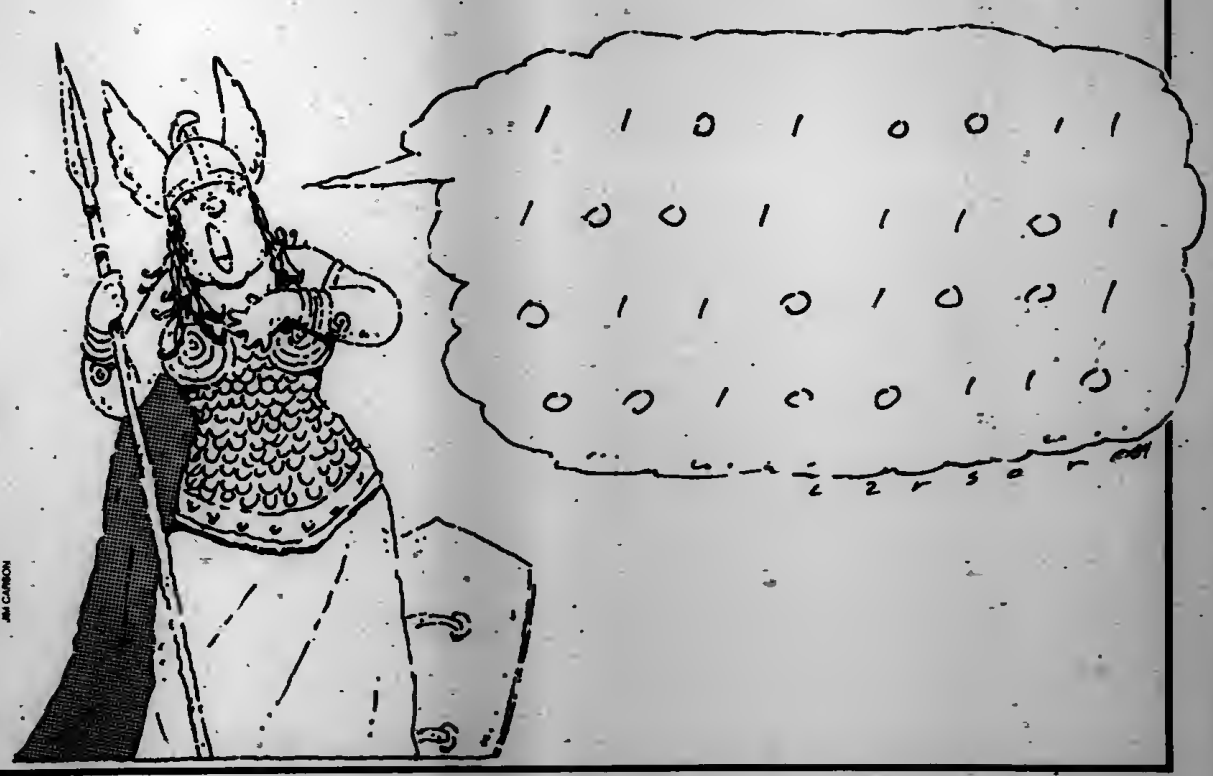
A conflict exists between the term "office automation" and the nuts and bolts procedure of automating today's office environment. As a result, management is often wary of the OA concept, frequently envisioning today's office as a treadmill that is becoming increasingly difficult to control in relation to costs, new equipment and human resources.

Current OA technologies include word processing, communications, accounting and business support systems, electronic mail and messaging systems, as well as public data bases, information services and private centralized computer systems serving remote offices through data communications networks.

Though these units and information sources have individually increased office productivity, a major source of the conflict between the OA concept and reality can be credited to the inability of these individual systems to communicate with each other. Particularly in larger organizations, this lack of equipment integration has led management to resist the OA concept because the full benefit of the technologies involved has not been realized.

The voice-data private branch exchange (PBX) is a solution to this problem. Its value can be traced to the data terminal, which commonly provides access to most office information sources. Approximately 5% of today's office workers use a data terminal in their jobs. This number will increase to 50% in the near future because of the increased need for information and the reduced cost of terminals. Whether the device is a display or dumb terminal, a personal computer, an intelligent workstation or an advanced voice-data workstation, the voice-data PBX can effectively offer the information terminal user access to various OA technologies and information sources.

The voice-data PBX is an office switching system that handles voice communications in addition to data



communications. Modern PBX systems have been switching data in the form of digitized voice for the past seven years.

Consequently, it is highly feasible for the digital PBX to add the capability of switching computer data. The only modification is in the interface to the data distribution system and the data terminal. The actual PBX switching network does not need to know whether the information it is passing is digitally encoded voice or data.

One major advantage the voice-data PBX offers the data user is access to many different resources, such as computer ports for local applications and modems and multiplexers for connecting to remote computers. Formerly, the user was connected directly to a computer. A different terminal was used to access an application stored in another computer. With the voice-data PBX, the user's terminal can become a multipurpose workstation by independently switching to many computers upon request.

Cost-efficiency is another important value of the voice-data PBX. The automated office already utilizing a PBX has an extensive local network, the telephone wiring plant, which can be exploited for data transmission at low cost. When the telephone instrument sitting on every office worker's desk is connected to the voice-data PBX, it can become the outlet for numerous data features.

For obvious reasons, the data terminal is a cornerstone of the OA concept. The voice-data PBX is flexible enough to accommodate a wide variety of terminal types, as well as future terminal installations. At present, the most popular terminal is the low-cost asynchronous Ascii, which is capable of sending and receiving data at rates up to 19.2K bit/sec. They also represent 90% of the market and will continue to proliferate in the office environment.

More sophisticated data users or those who require local computing power for specialized functions may currently be using an intelligent terminal or personal computer. Because of the popularity of these devices, the need for intercommunications increases, as it also does with disk and printer services for resource sharing.

Intelligent terminals and personal computers rely on file transfers from a centralized data base to the local intelligent terminal for processing of information. Fast response time is an important factor in these transfers in order to enhance productivity. The voice-data PBX can handle asynchronous data rates (up to 19.2K bit/sec) and synchronous rates (up to 56K bit/sec) in order to support high-speed file transfers.

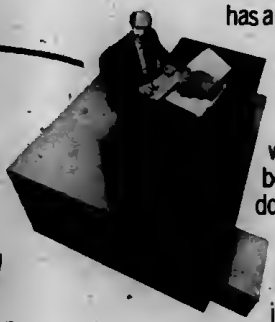
Just as a variety of data speeds must be accommodated, a multitude of data formats and protocols also exist. The voice-data PBX is capable of connecting various terminal types with their host computers. To do this, it must be transparent to the data and control signals being switched. Two examples of specialized data formats that require transparent switching are word processing systems and computer graphics terminals.

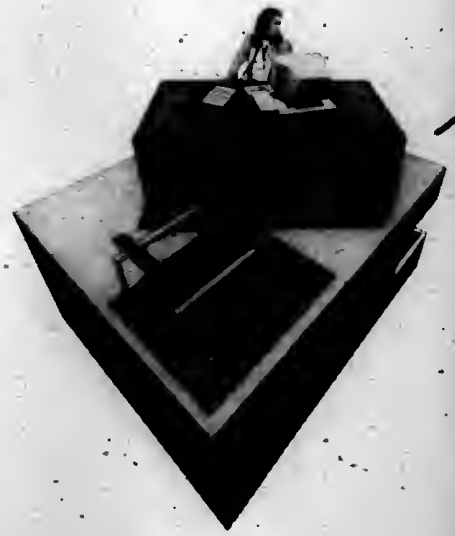
A step forward in PBX technology is the computer-to-PBX interface (CPI) standard, which has been accepted by Digital Equipment Corp., Hewlett-Packard Co. and some other major computer manufacturers. Certain manufacturers have enhanced the technology by designing systems that will support true end-to-end CPI, allowing not only T-1 interface to computers, but also terminal-to-computer parameter exchange. Fewer steps in protocol conversion result in a more effective link among terminal, PBX and computer with less costly telephone wire utilized as a shared resource.

An emerging trend in the telecommunications and DP industries is the introduction of combined voice-data workstations. These workstations incorporate a full complement of voice features and data terminal features. These new terminals are an important development in OA because they integrate voice and data at the user's desk and bring a number of information resources to the decision maker. As these terminals become as prevalent

With the voice-data PBX, the user's terminal can become a multipurpose workstation by independently switching to many computers.

We bring everything in your office closer together. That's what puts Wang way ahead.





Let's face it. Making things work together is where most computer companies fall apart.

They talk about compatibility, while they deliver a family of products that relate to each other in name alone.

Quite simply, that's what separates Wang from everyone else. Because unlike everyone else, Wang has a family of products that is truly compatible. From personal computers. To word processors. To office information systems. To large computers.

And it stands to reason that when everything in your office works better together, everyone in your office does too.

As more people manage information and communicate it in more ways than ever before—in words, images, numbers and voice—it just makes sense to choose Wang.

Because Wang offers you total solutions that bring everything, and everyone, in your office closer together.

That's what puts Wang way ahead.

For a presentation on Wang office automation computers, call 1-800-225-9264. Or write to Wang Laboratories, Inc., Business Executive Center, One Industrial Avenue, Lowell, MA 01851.

WANG

The Office Automation Computer People.

CO4

and useful as the telephone is today, they will become a significant tool for retrieval and manipulation of information in the automated office.

Still another important value of the voice-data PBX is its suitability for networking. Networking capabilities — the ability to efficiently link various information sources together — have become increasingly more critical. This has happened because the information source or service a user requires often exists outside the local facility. In this case, the user wants access to a data communications network to connect to that distant resource. The voice-data PBX is capable of interfacing with data communications networks via analog facilities. The PBX is the hub of the office's voice communications network; it is a small step to adapt that hub to provide data communications over voice-grade lines.

The modem pool is the prime tool for this application. For example, the system can route the data call via the modem pool to a company's private network over leased or private lines. This would be particularly effective if a company relied extensively on networks to communicate with distant computers, such as financial institutions or airline reservation agencies.

Another example might be the case of the user that requires business information services, such as Dow Jones reports. This user could use the modem pool to access information service data networks, such as Compuserve, Inc.'s offering, over central office or other common carrier trunks. Other global communications networks such as GTE Telenet Communications Corp.' Telenet and Tymnet, Inc.'s Tymnet are being used by many companies for corporate data base access, as well as for access to advanced office features such as electronic mail and protocol conversion.

The voice-data PBX system will offer more advanced networking services in the future through direct digital interfaces. More effective data transfer can be realized over the public data networks which offer interfaces at 56K bit/sec and higher synchronous data transmission rates on the customer premises. Networks such as the Advanced Information Service (AIS)/Net 1000, Telenet, Tymnet, Satellite Business Systems and others are now emerging in the marketplace with this capability.

Still another important value of the voice-data PBX is its suitability for networking. Networking capabilities — the ability to efficiently link various information sources together — have become increasingly more critical.

Eliminating the direct connection between the terminal and the information resource through the installation of a voice-data PBX can assuredly provide greater access to different resources for the user. However, these gains can be negated if the PBX imposes another level of procedures to access the desired resource. User acceptance of the voice-data PBX is an important element in providing the maximum utility of the data switching service in the office.

One procedure may require the user to set up the data call similar to dialing a voice call using the traditional telephone. This procedure can be removed using a prearranged connection much like a hot-line voice call.

This can be effective if the user is dedicated to one particular function. However, the intensive user needing switching access to multiple resources requires the PBX to be transparent for establishing data connections. This can be accomplished by allowing the terminal rather than the telephone to be the call-originating device.

The user then keys in the task to be performed (or the name of the source), rather than the directory number (or complex code) of the resource in which it is stored. In this way, the procedure is oriented more toward both the DP professional and the occasional user.

The voice-data PBX has another advantage over a separate data communications or switching network: the centralized maintenance and administration facility. Service orders can be used to specify both voice terminal and data terminal changes. The service order routines may be accessed through the data switching feature via the terminal, allowing an authorized user to input moves and changes on any terminal.

This can offer two benefits to the administrator of a company's communications system: reduced costs of terminal moves or additions, and a common procedure to be used for both telephone and terminal changes.

A centralized facility would also be useful for collecting administrative reports such as call detail recording and traffic reports. Similarly, maintenance and testing of the system are simplified through the common control. Integrity of the data transmission network may be verified through manual and automatic loopback of data at the data interface unit and at the PBX inlet. If the PBX detects a problem affecting service to a number of users, it can generate an alarm and maintenance message so that a serviceman can quickly repair the system.

The OA concept has generated several theoretical tangents during its development. One tangent, the tripod theory, saw OA composed of three basic technologies: DP, WP and telecommunications. Each technology would occupy its own corporate turf with distinct responsibilities. Another saw a tug-of-war between the PBX and the computer.

However, what appears to be occurring is exactly what OA analysts originally predicted some 20 years ago — a merger between two technologies: telecommunications and information processing — and it is drawing mixed reaction.

It is important to underscore that, despite its recent period of rapid growth, telecommunications is not a new industry. Leading edge developments in the industry date back more than 50 years, with the research and development of the semiconductor and transistor paving the way for the computer industry.

Present-generation voice-data PBX and communications-related instruments like electronic telephones and voice-data workstations are unmistakable indications of a merger between technologies. Further signals have been received from Wall Street, where several industry giants are deliberately crossing paths with new business ventures.

The old guard from both industries will undoubtedly voice concerns. The question of departmental control within corporate organizational structures is already beginning to surface. But in an extremely competitive market where the stakes are high, two important questions remain: What does the end-user need, and what is the best solution?

The voice-data PBX offers the advantage of integrating voice and data communications in a single system, thus allowing OA to take a giant step forward, away from the conceptual storybook stage. OA

Combs is vice-president of marketing for American Telecom, Inc., which is located in Anaheim, Calif.

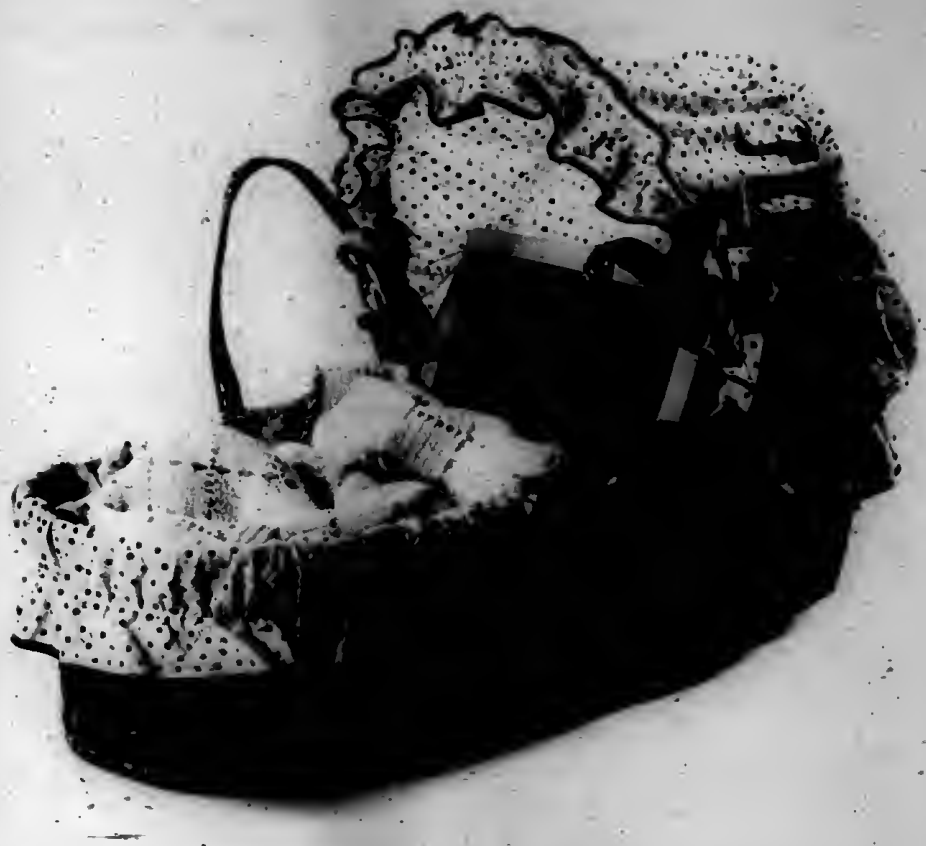


PHOTO © 1984 ED BRAVERMAN

Information Systems Deliver

By Jeri Lynn Edwards

Data processing technology has promised two things to corporations: increased productivity of operational groups and integrated information management.

It has delivered consistently on the first promise; however, it has not been so successful in integrating information for planning and control.

Most companies find themselves with only a partial automation of their information systems, for several good reasons:

- ***Unproven benefits.*** Corporations want to understand the benefits and risks associated with computerization before they commit vast resources to it.
- ***Resource limitations.*** Most companies cannot afford to automate everything. Instead, they start in areas where consistent high quality is required and the potential return on investment is highest.
- ***Unavailable technologies.*** Computer technology is advancing rapidly. In many cases, however, corporate needs go beyond vendor offerings. For example, the need for good graphics that can be used in conjunction with text-editing equipment has existed for a long time, but only recently have such packages become available.

Constraints such as those listed above have caused most corporations to develop DP systems for various operational areas one at a time; given the state of technology, this has been a prudent strategy. Now, however, such piecemeal approaches make integration very difficult. The applications have been developed separately on various different computer systems, and the "hooks" required for integration with other systems simply do not exist.

Corporations (and individual divisions within corporations) are all different from the standpoint of information management. The following four stages of development summarize the range of conditions that may exist:

- Stage 1. Centralized automation.
- Stage 2. Decentralized automation.
- Stage 3. Rudimentary networks.
- Stage 4. Integrated information networks.

Centralized Automation. In Stage 1, corporations are just beginning to understand computer technology. One or two key functions are automated, usually in a centralized computer system under the direct control of a corporate DP group. Typically, the applications perform highly structured tasks formerly done by production workers or clerks. No provision is made for interactions between applications, even though they run on the same computer.

Stage 1 can be characterized as follows:

- A few business functions in important operational areas are separately automated.
- The automated functions are simple structured business tasks.
- The applications run on batch-oriented stand-alone computer systems under the control of a central DP department.
- Typically, they do not require a

sophisticated data base management system.

• The applications are not integrated, and the data is rarely shared (even though computer resources are centralized).

• Middle and upper management find it hard to use the reports that are generated (because of their bulk, complexity, and single-area focus).

Decentralized automation. As large organizations advance to Stage 2 in their management of information, they begin to automate more and more functions in the operational areas. In addition, minicomputers begin to proliferate. Every manager is struggling to meet deadlines, every manager sees that computers could help get the work done, the hardware is relatively inexpensive and the machines are getting simpler to program. In the quest for immediate solutions to pressing problems, it is not difficult to justify the purchase of minicomputers, small business computers, word processors and so on.

As a result, the corporate computing environment becomes decentralized. Independent systems spring up, geared totally to local concerns and relying on data bases dedicated to and customized around particular applications. These systems and their associated data bases tend to be viewed as private property because they are bought, developed and managed at the operational level. At that level, few managers think about the vague and distant problem of integrated information management and few think to consult the central DP department about the problem of compatibility with existing equipment.

Because of the variety of these systems and their applications (and the absence of central control), several different ways of entering and reporting information will probably develop. Some applications will be batch-oriented, as in Stage 1. Others will be transaction-oriented (designed to process data relevant to individual business transactions as those transactions occur). The transaction-oriented applications will have advanced data base management systems that allow managers to query the data base interactively. Some systems will produce periodic listings or reports that will be rekeyed into the central corporate data base. Occasionally, such reports will be transferred to magnetic tape; in that form, they will be sent to some interested organization.

Developments in Stage 2 can be summarized as follows:

Multiple computer sites emerge, often with equipment from different vendors. Applications move out to user locations, where the data is generated and used.

Specific business tasks are automated. The automated processes use separate data bases customized for the local environment. The end user is accountable for the quality of the data.

In Stage 2, few managers think about the distant problem of integrated information management and few consult central DP about compatibility.

Some applications may be interactive, transaction-based and on-line, although many will still use batch techniques for data entry and retrieval.

Very few automated linkages exist between the computer systems. When there is a need to share or transfer information, data produced on one system has to be transported physically to the other.

As in Stage 1, managers can get only raw operational information from the various computer systems. However, in Stage 2, they may be able to access some of it interactively.

Rudimentary networks. In Stage 3 of the evolution of corporate information systems, additional functions are automated and communications links or rudimentary networking facilities begin to spring up selectively between specific computer systems.

The communications technology remains rudimentary at this stage. Most often, it allows only simple bulk transfers of data between systems. However, data base management systems, which allow data to be accessed interactively by users at terminals and by processes running on the computer, are becoming more advanced. When combined with sophisticated networking software, these advanced systems extend the interactive reach of local terminals and processes across several machines, thus creating a single virtual system composed of geographically distributed computers.

The major new developments in Stage 3 can be summarized as follows:

- Rudimentary, static linkages are formed between various application domains.
- Interdomain information for middle management is derived from these linkages.
- Advanced data base management technologies facilitate interactive queries of the information within some application domains.

Integrated information networks. In Stage 4, information management systems achieve a balance between decentralization (users doing as they please locally) and integration (ready availability throughout the company of various kinds of information from various different systems). Clearly the establishment of such a system is more than a technical achievement. It represents upper management's firm decision and commitment, based on an understanding of the critical importance of information management to the health of the corporation.

An integrated information management system of this kind, providing managers with a dynamic view of the state of the corporation, would almost certainly improve the quality of tactical and strategic decision making.

In Stage 4, information management systems achieve a balance between decentralization (users doing as they please locally) and integration (ready availability throughout the company of various kinds of information from various different systems).

There are at least three competing strategies for bringing such systems into being:

The single-vendor strategy: A corporation might create a Stage 4 information management system by working exclusively through a mature vendor that offers a broad range of vertically integrated computer products: networking, utility processors, advanced peripherals (such as printers or optical character scanners) and user workstations. Such vendors promise an integrated environment to users purchasing equipment and software exclusively from them.

However, the single-vendor solution locks the corporation into the products of a particular vendor and such vendors typically offer only low-level interfaces to other systems. Thus, the single-vendor approach is reasonable under either of two conditions. Under the first, corporations have no applications running on computer systems made by other vendors. Under the second, they are willing to rewrite those applications and live with the constraints imposed by the technology decisions of the chosen vendor in the future.

If applications must be rewritten, Stage 4 becomes more a revolutionary than an evolutionary development in the life cycle of the information management system, and the cost may be prohibitive.

The network-operating-system strategy: Integrated information management systems can be developed from diverse computer systems if the organization is willing to develop a layer of software compatible with each computer, providing a common data base and network architecture. However, most corporations do not have the resources needed to do this, and there is an alternative.

Several groups, such as the International Standards Organization (ISO), the Institute of Electrical and Electronics Engineers (IEEE) and the Consultative Committee for International Telegraph and Telephone (CCITT) are working on standards for a software layer that would provide a network operating system.

Computer system vendors are expected to adopt these standards, which will make possible the development of integrated information management systems through the common interface.

The following factors will probably prevent most corporations from implementing network operating systems as a way of advancing to Stage 4 in their information management:

Most of the new standards will be completed between 1984 and 1986, and it will probably take six or seven years for a substantial percentage of the vendors to modify their hardware and software to accommodate these standards. Thus, corporations interested in integrated information management will have to wait a long time for vendor-supplied solutions.

The only way a corporation can avoid the delay is to implement a network operating system itself, and this would require resources few of them have.

In either case, a network operating system would introduce a substantial amount of processing overhead — the existing systems would end up having to do a great deal of additional processing to maintain the integrated information environment.

The intelligent-network strategy: is the third strategy for developing an integrated information management system, a network of similar processors is established to provide a unified interface through which diverse computer systems could be linked. This single multifunction network would link and manage all information resources, tying people, devices, data and procedures together.

Key features of this concept are the following:

The intelligent network would perform all advanced communications and integration functions for the corporation, such as data base maintenance and report/inquiry capabilities; format-translation services between various data record structures, document images, screen displays and so on; message switching for various forms of information, such as graphics, facsimile images, voicegrams, text and formatted data; and information routing to the appropriate recipients, by content as well as by address.

The corporation's various interactive domains would be connected through the intelligent network. The network also provides access to an external information source (Bell's Advanced Information System (AIS)/Net 1000), which furnishes commodity information, stock prices, news reports and other kinds of information.

Information sent to the intelligent network from the application domains can be forwarded to other domains or stored in the network. The network can automatically translate between the different formats of the attached data bases.

The intelligent network provides the best of two worlds. It is a corporatewide resource under centralized control. Thus, there is centralized access to all resources, but it is physically distributed throughout the company. Such an arrangement reduces the high communications costs associated with an integrated information management system based on a central monolithic computer. It also adds to the fault-tolerance of the system and facilitates the development of customized interfaces or gateways to the network for each of the local environments. Each application domain interfaces to the intelligent network through a gateway designed specifically to meet its needs and capabilities. Thus, each can obtain information with and offer information to other domains without knowing about the particular communications ability of those domains. OA

Edwards is a data communications engineer at Tandem Computers, Inc. in Cupertino, Calif.

Communications.

How to tie things together today without being tied down tomorrow.

This April, *Computerworld Office Automation* will give you a close look at the world of communications products and services. You'll read about what's out there now and what's coming. And how to get started while leaving your architecture open for the technologies of the future. And you'll get it all from the perspective of end users who have to increase productivity *now* while making sure the their company's investment won't be obsolete in two years.

And that's not all. There'll be feature articles on:

- PBX *versus* local area networks and how they'll merge
- voice technology
- videoconferencing technology
- satellite technology
- inter and intra company communications strategies
- product evaluations and comparisons

And after we cover all the developments for you, we'll offer you strategies to link them all together into one integrated system.

Computerworld Office Automation is designed to give you OA information geared to the DP/MIS environment — in a way that no traditional office publication can. As one of *Computerworld's* 114,000 subscribers in the U.S, you'll get six issues of *Computerworld Office Automation* in 1984 — as part of your subscription! And if your users need to increase their communications links, you won't want to miss this issue devoted to Communications in the office.

If you've got office automation and office communication products our readers should know about, then you need to get your ad reservation in by March 2nd.To reserve ad space in this April 11th issue of *Computerworld Office Automation*, call one of the sales offices listed below, or Ed Marecki, National Sales Director at 617-879-0700.

To: Ed Marecki, *National Sales Director*
CW Communications/Inc.
Box 880
Framingham, MA 01701

☐ *Please send me advertising information on Computerworld Office Automation.*

☐ *Please have a sales representative call me.*

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____ 4/11

Computerworld
OFFICE AUTOMATION

BOSTON/Chris Lee, Jayne Donovan, Michael Kelleher, Ron Mastro, Jim McClure, Alice Longley, *(617) 879-0700*

CHICAGO/Art Kossack, Chris Lee, Jean Broderick, *(312) 827-4433*

NEW YORK/Mike Masters, Doug Cheney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno, *(201) 967-1350*

ATLANTA/Jeffrey Melnick, Mike Masters, *(404) 394-0768*

SAN FRANCISCO/Bill Healey, Ernie Chamberlain, Theodora Franson, Barry Milione, Nicole Boothman (recruitment), *(415) 421-7330*

LOS ANGELES/Bernie Hockswender, Bob Hubbard, Bill Healey *(714) 261-1230*

TECHNOLOGY

MAYNARD, Mass. — Dectalk, a voice synthesis product that reportedly allows computers to read aloud and that provides unlimited vocabulary was introduced by **Digital Equipment Corp.** Dectalk will be priced at $4,000 and will be available in March.

DEC also announced enhancements to its Decmate II Office Workstation; its All-In-One product; communications links to Wang Laboratories, Inc. and IBM; a Unix-like operating system for its VAX minicomputers; and an agreement with Microsoft Corp. to support Microsoft Windows for DEC's Rainbow personal computers.

Among the enhancements to Decmate II were Decmate/Decspell, Decmate Graphics Option and WPS word processing software version 1.5. For its All-In-One system, DEC unveiled Decpage for high-quality document output and Decdx for transfer of full documents between VAX systems and DEC WP systems. The company introduced Bi-synchronous Terminal Support to allow document exchange with IBM 3270-type terminals and VAX systems; and External Document Exchange, which allows full document transfer between VAX and Wang's OIS Office System.

Decspell, WPS word processing version 1.5, Decpage and Decdx will be available this spring and will cost $395, $995, $7,000 including service and $2,650 with service, respectively. Decmate Graphics Option costs $695 and the BTS product is priced at $3,000 with service; both are available now.

More information on all the DEC announcements is available from Digital Equipment Corp., Main St., Maynard, Mass. 01754.

NEW YORK — **AT&T** announced the release of a new, enhaneed version of Unix System V and introdueed three new software packages designed to serve in a Unix environment.

According to the company, the new version of Unix will run programs about 5% to 10% faster than the current offering and offers greater job control; a new way to handle electronic mail; and a new command, which allows administratora and users to send trouble reports to the Unix software support center.

AT&T also unveiled Unix Doeumenter's Workbeneh, Unix System Basle and the Motorola Software Generation System designed for useta that are developing software using Motorola's 68000 microprocessor.

The enhanced version of Unix System V is available for $43,000 for an initial source license (those already holding System V licenses can get the upgrade and Workbench for $2,500). Workbench is priced at $4,000 for an initial license; Basic at $5,000; and the Motorola Software for $7,500 for an initial license, the vendor said.

For more information, contact AT&T Technologies Software and Sales Division, Greensboro, N.C.

RYE BROOK, N.Y. — **IBM** unveiled its Personal Computer Interactive Executive (PC/IX) operating system, derived from AT&T's Unix Time Sharing System, for its PC. The system can reportedly be used for program development, text processing or running a variety of existing Unix system application programs.

According to IBM, PC/IX is a recompiled set of Unix system source statements with a redesign of the essential portions of code to improve performance and reliability. It was developed for IBM by Interactive Systems Corp. and runs on both the IBM PC and the PC XT, requiring at least 256K of memory, one dual-sided diskette drive and one 10M-byte fixed-disk drive. The product, available in April, will be priced at $900 for a one-time license charge from IBM, 900 King St., Rye Brook, N.Y. 10573.

SANTA CLARA, Calif. — The British are coming (and they're bringing personal computers). **Applied Computer Techniques (ACT)**, Great Britain's largest microcomputer company, has in-

TECHNOLOGY

troduced its Apricot executive microcomputer in the U.S. Apricot, reportedly a fourth-generation, IBM-compatible, 16-bit microcomputer, is 8086-based and includes 256K bytes of main memory, three operating systems (MS-DOS, CP/M-86 and concurrent CP/M-86), 3½-in. Sony Microdrives and bundled executive software. The Apricot weighs 17½ lbs and can be used in a portable mode.

It is available for $2,495 from ACT (North America), Inc., 3375 Scott Blvd., Suite 336, Santa Clara, Calif.

CUPERTINO, Calif. — While most of the attention has been focused on the Macintosh, Apple Computer, Inc. introduced a lower priced, enhanced version of its Lisa system.

The Lisa 2 series includes three new versions of Lisa: Lisa 2, Lisa 2/5 and Lisa 2/10. The Lisa 2 reportedly has 512K bytes of memory and a 3½-in. microdisk drive for mass storage. The Lisa 2/5 and 2/10 share these features and offer additional mass storage. Each member of the series can also run programs designed for the Macintosh as well as Lisa software.

Apple is offering owners of the original Lisa a free upgrade to a Lisa 2/5 until June 1 (after which time the upgrade will cost $595) or an upgrade to a 2/10 for $2,495. The series ranges in price from $3,495 to $5,495 from Apple Computer, Inc., 20525 Mariani Ave., Cupertino, Calif. 95014.

LOWELL, Mass. — Wang Laboratories, Inc. announced enhancements to its Professional Computer as well as to its DVX Digital Voice Exchange.

For its Professional Computer, Wang introduced the 3278 Emulation Board, a combined hardware and software package that allows the Professional Computer or the Wang Professional Image Computer to access instantly an IBM mainframe data base when attached to a 3270 terminal network. The 3278 Emulation Board is available as a stand-alone product or as an attachment to the Wangnet Cmux-3270 Cable Multiplexer. It costs $1,095 and will be available next month.

Wang and Microsoft Corp. of Bellevue, Wash., announced that Microsoft Windows, an extension of the MS-DOS operating system will be available for the Wang Professional Computer. The product will be offered as part of the bundled software for the Professional Computer beginning in the second quarter of 1984.

Wang also unveiled enhancements to its DVX digital voice exchange including the DVX Message Waiting unit (priced at $225 per unit), DVX networking capabilities ($1,000 per node and $10 per month license fee) and DVX Feature Package 3.8 ($14,000 initial charge and $140 license fee).

For more information, contact Wang, One Industrial Ave., Lowell, Mass. 01851.

MORRIS PLAINS, N.J. — The Monroe System 2000, a 16-bit high-speed microcomputer, was introduced by Monroe Systems for Business, Inc. The System 2000 is based on the Intel 80186 microprocessor and comes complete with the CP/M 86 DPX and MS-DOS operating systems, 128K bytes of random-access memory expandable to 896K bytes and a 12-in. amber monochrome video display screen.

The system is available for $3,675 from Monroe Systems for Business, The American Road, Morris Plains, N.J.

NEW YORK — Pro Computing has unveiled its integrated software package for business professionals.

Propel is reportedly fully integrated and has multiple applications such as phone communications, written communications and number processing. It can be used to send and receive voice messages; prepare letters, memos and reports; and analyse numerical data presented in tables, graphs and spreadsheets, the vendor said.

Propel will initially operate on Digital Equipment Corp.'s Professional 350 microcom-

puter and will be available in March for $1,195 (minimum orders) from Pro Computing, Suite 3314, One Penn Plaza, New York, N.Y. 10119.

HOUSTON, Texas — Zalsan, Inc. introduced its ES.1 voice/data workstation.

The ES.1 reportedly integrates an advanced executive-feature telephone; a data terminal with a 9-in. high-resolution CRT; an internal 300 bit/sec. full-duplex modem; a detachable keyboard; and personal business support software.

The ES.1 is scheduled for shipping in the first quarter of 1984 and is priced at $850 from Zalsan, Inc., 13910 Champion Forest Drive, Houston, Texas 77069.

SANTA MONICA, Calif. — Compucorp, Inc. announced its CA 3200 minicomputer and Omegamite, a transportable version of the company's word processing equipment. The CA 3200 is a 10 MHz 68000-based CPU, with error-correcting memory ranging from 256K bytes to 2M bytes. It features several I/O processors and four independent buses, including the IEEE 796 Multibus and includes two high throughput front-end communications processors for supporting multiple local-area networks.

Omegamite reportedly combines a WP package and support of a host of CP/M applications in a transportable device that weighs less than 25 lbs. It is targeted at professionals who spend considerable amounts of time away from their offices. It is available with from 64K to 512K bytes of random-access memory, single or dual 655K-byte floppy disks, a 9-in. amber CRT and a communications modem.

Omegamite is priced at $2,995 from Compucorp, 2211 Michigan Ave., Santa Monica, Calif. 90404.

JERICHO, N.Y. — Computer Associates International, Inc. has released CA-Executive, a microcomputer software product for the executive workstation. The product reportedly consists of a full line of integrated business applications, a micro-to-mainframe link and communications facility, as well as a window manager.

CA-Executive was designed to run on IBM and compatible micros including IBM's PC/XT. It runs under the PC DOS 2.0 operating system and uses a full-color graphics monitor. It requires 256K bytes of memory and includes data base management, spreadsheet, WP, editing, graphics and others.

CA-Executive is priced at $1,295 for five to 10 units (with prices descending as order size increases) from Computer Associates International, 125 Jericho Turnpike, Jericho, N.Y. 11753.

SECAUCUS, N.J. — Panasonic Co. introduced its personal portable computer, the Senior Partner. The portable reportedly utilizes the the MS-DOS 2.0 operating system and can run IBM-compatible software and hardware. It also features a built-in thermal printer, a double-sided, double-density disk drive, 128K bytes of random-access memory and a 9-in. CRT.

The Senior Partner utilizes a 16-bit 8088 microprocessor with an 8087 coprocessor socket. It weighs 28.7 lbs and will be available in March for $2,495 from Panasonic, One Panasonic Way, Secaucus, N.J. 07094.

NORWOOD, Mass. — Raytheon Data Systems Co. made its entry into the office automation market with the introduction of its RDS Signature 8200, a 16-bit business computer featuring DP, WP and communications capabilities.

The system is available with either a 15-in. color or 12-in. monochrome monitor and reportedly features the F8300 Processor module as the core of each workstation. A typical WP configuration, consisting of the monochrome display and keyboard, processor module with dual floppy drives and 512K bytes of random-access memory costs $9,050 from Raytheon Data Systems, 1415 Boston-Providence Turnpike, Norwood, Mass. 02062. OA

CALENDAR

Feb. 18-19, Los Angeles — **Third Annual Office Systems Research Association Conference.** Contact: Joel D. Levy, Conference Chairman, 115 Maywood Drive, Rochester, N.Y. 14618.

Feb. 20-22, Los Angeles — **1984 Office Automation Conference.** Contact: Afipe, 1899 Preston White Drive, Reston, Va. 22091.

Feb. 21, 23, New York — **Unix System: Concepts and Facilities.** Contact: Women in Data Processing, Inc., 310 Madison Ave., New York, N.Y. 10017.

Feb. 22, New York — **Introduction to Local-Area Networks.** Contact: Women in Data Processing, Inc., 310 Madison Ave., New York, N.Y. 10017.

Feb. 22-24, Sacramento, Calif. and Indianapolis — **Personal Computers and Networking.** Also, Feb. 27-29, Denver. Contact: Center for Advanced Professional Education (Cape), 1820 E. Garry St., Suite 110, Santa Ana, Calif. 92705.

Feb. 27-28, Boston — **Software Tools for Distributed Decision Support Systems.** Contact: Software Tools Conference, Suffolk University, Boston, Mass. 02108.

Feb. 27-29, Orlando, Fla. — **Local-Area Networks.** Contact: Cape, 1820 E. Garry St., Suite 110 Santa Ana, Calif. 92705.

Feb. 28-29, Washington, D.C. — **Forum on Unauthorized Access.** Contact: The Videotex Industry Association, 1901 N. Fort Myer Drive, Suite 200, Rosslyn, Va. 22209.

Feb. 29-March 1, San Francisco — **Public vs. Private Networks After Divestiture.** Contact: Probe Research, Inc., P.O. Box 590, Morristown, N.J. 07960.

March 1, New York — **Microcomputers: High Performance/High Payoff.** Contact: Micro Conference, 215 First St., Cambridge, Mass. 02142.

March 2, Boston — **The Micro Meets the Mainframe — IDC Briefing Session.** Also, March 5, Washington, D.C.; March 7, Chicago; March 9, Dallas; March 12, Los Angeles; and March 14, San Jose. Contact: International Data Corp., 5 Speen St., Framingham, Mass. 01701.

March 8-9, San Francisco — **IBM Futures (1983-1988).** Contact: Techtran, 72 Cummings Point Road, P.O. Box 10212, Stamford, Conn. 06904.

March 12-15, Las Vegas — **Interface '84.** Contact: Interface '84, 300 First Ave., Needham, Mass. 02194.

March 13-15, Los Angeles — **Optical Storage of Documents and Images.** Contact: Technology Opportunity Conference, P.O. Box 14817, San Francisco, Calif. 94114.

March 19, Washington, D.C. — **Federal Office Systems Expo.** Contact: National Trade Productions, Inc., 9418 Annapolis Road, Lanham, Md. 20706.

March 19-22, Chicago — **Office Automation Society International Annual Conference.** Contact: OASI, 2108-C Gallows Road, Vienna, Va. 22180.

April 11-12, New York — **Executives in the Changing Environment.** Contact: The Conference Board, Inc. P.O. Box 4026, Church St. Station, New York 10249.

Computerworld Sales Offices

Donald E. Pogue, Vice-President/Sales. Edward P. Marecki, Director/National Sales. Frank Collins, Corporate Advertising Administrator. Kathy Doyle, Marketing Support Manager. Elaine Carlos, Special Publications Ad Coordinator. COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, Mass. 01701. Phone: (617) 879-0700. Telex: 95-1153.

BOSTON SALES OFFICE: Chris Lee, Northern Regional Director. Jim McClure, Ronald Mastro, Jayne Donovan, Michael F. Kelleher, District Managers. Alice Longley, Sales Assistant. COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, Mass. 01701. Phone: (617) 879-0700, Telex: 95-1153.

NEW YORK SALES OFFICE: Michael J. Masters, Eastern Regional Director. Doug Cheney, Senior District Manager. Ray Carlin, Joan Daly, Fred LeSapio, District Managers. Gale M. Palermo, Sales Assistant. COMPUTERWORLD, Paramus Plaza I, 140 Route 17 North, Paramus, N.J. 07652. Phone: (201) 967-1350.

CHICAGO SALES OFFICE: Art Kossack, District Manager. Joan F. Broderick, Sales Assistant. Chris Lee, Northern Regional Director. COMPUTERWORLD, 2600 South River Road, Suite 304, Des Plaines, Ill. 60018. Phone: (312) 827-4433.

LOS ANGELES SALES OFFICE: Bob Hubbard, Senior District Manager. Bernie Hockwender, District Manager. Beverly Raus, Account Coordinator. William J. Healey, Western Regional Director. COMPUTERWORLD, 18008 Skypark Circle, Suite 260, Irvine, Calif. 92714. Phone: (714) 261-1230.

SAN FRANCISCO SALES OFFICE: William J. Healey, Western Regional Director. Barry G. Wilson, Senior District Manager. Theodora Franson, Ernest Chamberlain, District Managers. Ruth Gordon, Account Coordinator. Nicole Boothman, Recruitment Account Manager. COMPUTERWORLD, 300 Broadway, Suite 20, San Francisco, Calif. 94133. Phone: (415) 421-7330.

ATLANTA SALES OFFICE: Jeffrey Melnick, District Manager. Michael J. Masters, Eastern Regional Director. COMPUTERWORLD, 1853 Peeler Road, Suite D, Atlanta, GA 30338. Phone: (404) 394-0756.

ADVERTISERS INDEX

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.


SKS.
NCE.
BASF Qualimetric FlexyDisks
assurance that the vital
today will be secure and
extraordinary warranted
standard...a totally new set of criteria against
magnetic media will be judged.
You can count on BASF
reflects a continuing
perfection in magnetic
unique two-piece liner in our
BASF feature traps damaging
the disk's surface and creates extra
head access area for optimum media-head
alignment. The result is a guaranteed lifetime
of outstanding performance.
For information security that bridges
the gap between today and tomorrow,
look for the distinctive BASF package
with the Qualimetric seal. Call 800-
343-4600 for the name of your
nearest supplier.
*Contact BASF for warranty details.
BASF
FlexyDisk
NTER TOMORR
BASF

THE DAY THE IBM PC BECAME OBSOLETE.